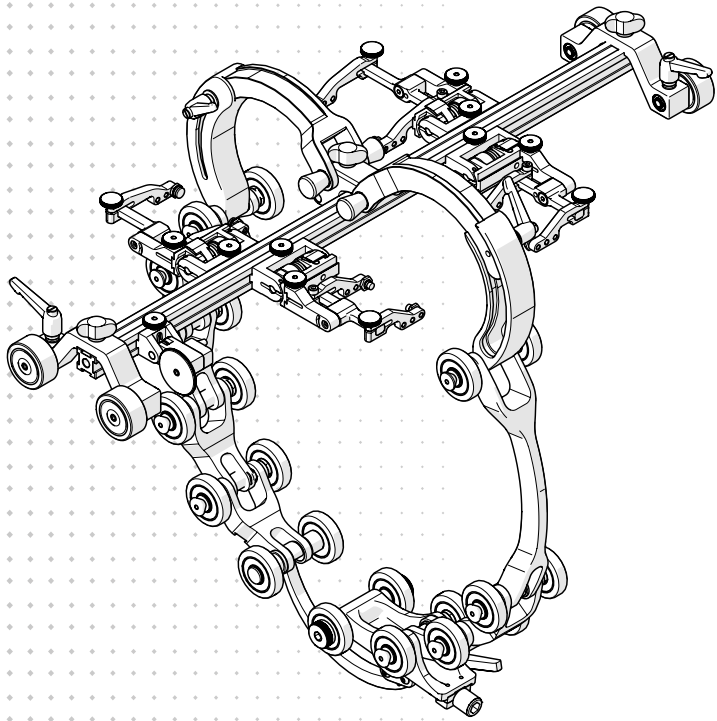
ROTIX



User Manual

Manual Chain Frame Scanner

JIREH

SCANNING TECHNOLOGY FOR NDT

KEEP THIS MANUAL – DO NOT LOSE

THIS MANUAL IS PART OF THE ***ROTIX*** AND MUST BE RETAINED FOR THE LIFE OF THE PRODUCT. PASS ON TO SUBSEQUENT OWNERS.
Ensure any amendments are incorporated with this document.

DANGER! The ***ROTIX*** is designed for a specific use. Using the ***ROTIX*** outside of its intended use could cause damage to the product. Read and understand this manual before using.

WARNING! MAGNETIC MATERIAL. The wheels of this device produce a magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics.

People with pacemakers or ICD's must stay at least 25 cm *(10")* away at all times.

WARNING! Do **NOT** operate scanner in an explosive environment. Do **NOT** operate scanner in the presence of volatile substances.

The **WEEE** symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.

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1. Introduction

1.1. Product information

1.1.1. Intended use

The ***ROTIX*** chain scanner is a manually operated scanner which provides encoded probe positions of two or four probes. The double wheel chain components straddle the weld and fasten a scanning frame circumferentially around pipe or tubing.

1.1.2. Performance specifications

	Minimum	*Maximum*
Pipe/Tube range	38.1 mm *(1.5 in)*	965.2 mm *(38.0 in)*
Umbilical length (Standard kit)	5 m *(16.4 in)*	
X-Axis encoder resolution	9.05 counts/mm *(230.0 counts/inch)*	

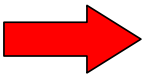
1.1.3. Operating environment

The ***ROTIX*** chain scanner is designed for use in an industrial environment that is between -20° C *(-4° F)* and 50° C *(122° F)*.

1.1.4. Environmental Sealing

Dust tight, water tight (not submersible).

1.2. Definition of symbols

	Instructions to ‘look here’ or to ‘see this part’.
	Denotes movement. Instructing user to carry out action in a specified direction.
	Indicates alignment axis.
	Alerts user that view has changed to a reverse angle.

1.3. Hardware

1.3.1. Included tools

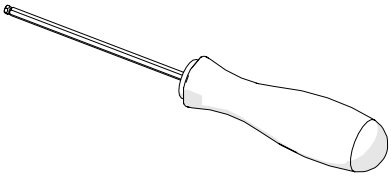


Fig. 1 - 3 mm hex driver

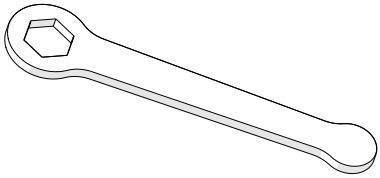


Fig. 2 - 3/8 in wrench

The 3 mm hex driver *(Fig. 1)* is sufficient for all typical operations and adjustments of the ***ROTIX***. The 3/8 in wrench *(Fig. 2)* is used to remove and install buttons on the probe holders.

1.3.2. Optional tools

Some specialized adjustments require tools that are not included with this kit.

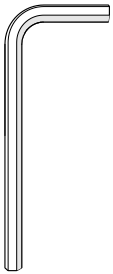


Fig. 3 - 1.5 mm hex wrench

Fig. 4 - 2 mm hex wrench

Fig. 5 - 2.5 mm hex wrench

Fig. 6 - 3 mm hex wrench

1.3.3. Maintenance

General cleaning of components is important to keep your system working well. All components that have no wiring or cables are completely waterproof. Components can be washed with warm water, dish soap and a medium bristle brush.

After washing your system, use a light oil to lubricate the slide and the adjustment screw on the buckle component *(Fig. 33)*. Before using the scanner, ensure all connectors are free of water and moisture.

NOTE: *All components with wiring, cables or electrical connections are splash proof. However, these components are* ***NOT*** *submersible.*

NOTE: *Never use strong solvents or abrasive materials to clean your scanner components.*

1.4. Two Probe Chain Configuration Setup Chart

PIPE SIZE					
MIN *(in)*	MAX *(in)*	MIN *(mm)*	MAX *(mm)*	SHORT*	LONG
**SHORT INCLUDES: SHORT LINK, DOVETAIL LINK, RED CATCH LINK*					
3.8	4.6	97	117	2	0
4.5	5.3	114	135	3	0
5.2	6.1	132	155	4	0
6.0	6.9	152	175	5	0
6.8	7.7	173	196	6	0
7.5	8.5	191	216	7	0
8.3	9.3	211	236	8	0
9.1	10.1	231	257	9	0
9.9	10.9	251	277	10	0
10.7	11.7	272	297	11	0
11.7	12.6	297	320	9	1
12.4	13.4	315	340	10	1
13.2	14.2	335	361	11	1
13.5	14.4	343	366	2	4
14.3	15.2	363	386	3	4
15.0	16.0	381	406	4	4
15.9	16.8	404	427	2	5
16.6	17.6	422	447	3	5
17.4	18.3	442	465	4	5
18.2	19.2	462	488	2	6
19.0	19.9	483	505	3	6
19.7	20.7	500	526	4	6
20.5	21.5	521	546	5	6
21.3	22.3	541	566	6	6
22.1	23.1	561	587	7	6
22.9	23.9	582	607	8	6
23.7	24.7	602	627	9	6
24.5	25.5	622	648	10	6
25.3	26.3	643	668	11	6
26.1	27.1	663	688	3	9
26.9	27.9	683	709	4	9
27.7	28.7	704	729	2	10
28.5	29.5	724	749	3	10
29.2	30.3	742	770	4	10
30.1	31.1	765	790	2	11
30.9	31.9	785	810	3	11
31.6	32.6	803	828	4	11
32.5	33.5	826	851	2	12
33.2	34.2	843	869	3	12
34.0	35.0	864	889	4	12
34.8	35.8	884	909	5	12
35.6	36.6	904	930	6	12
36.4	37.4	925	950	7	12
37.2	38.2	945	970	8	12
38.0	39.0	965	991	9	12
38.8	39.8	986	1011	10	12
39.6	40.6	1006	1031	11	12

1.5. Four Probe Chain Configuration Setup Chart

PIPE OD RANGE					
MIN *(in)*	MAX *(in)*	MIN *(mm)*	MAX *(mm)*	SHORT*	LONG
**SHORT INCLUDES: SHORT LINK, DOVETAIL LINK, RED CATCH LINK*					
4.4	5.2	111	133	1	0
5.1	6.0	129	152	2	0
5.8	6.8	148	172	3	0
6.6	7.6	168	192	4	0
7.4	8.4	187	212	5	0
8.2	9.2	207	233	6	0
9.0	10.0	228	253	7	0
9.8	10.8	248	274	8	0
10.6	11.6	268	294	9	0
11.4	12.4	289	315	10	0
12.3	13.3	312	338	8	1
13.1	14.1	332	358	9	1
13.9	14.9	352	378	10	1
14.9	15.9	378	404	2	4
15.7	16.7	398	424	3	4
16.5	17.5	419	445	1	5
17.3	18.3	439	465	2	5
18.0	19.1	458	485	3	5
18.9	19.9	480	506	1	6
19.7	20.7	499	526	2	6
20.4	21.5	519	545	3	6
21.2	22.3	539	565	4	6
22.0	23.0	559	585	5	6
22.8	23.8	579	605	6	6
23.6	24.6	599	625	7	6
24.4	25.4	619	645	8	6
25.1	26.2	639	666	9	6
25.9	27.0	659	686	10	6
26.8	27.9	681	708	2	9
27.6	28.6	701	728	3	9
28.4	29.5	721	748	1	10
29.2	30.2	741	768	2	10
30.0	31.0	761	788	3	10
30.8	31.8	782	809	1	11
31.6	32.6	802	829	2	11
32.4	33.4	822	849	3	11
33.1	34.2	842	869	4	11
33.9	35.0	862	889	5	11
34.7	35.8	882	909	6	11
35.5	36.6	902	929	7	11
36.3	37.4	922	950	8	11
37.1	38.2	942	970	9	11
37.9	39.0	962	990	10	11

2.1. Two Probe Scanning

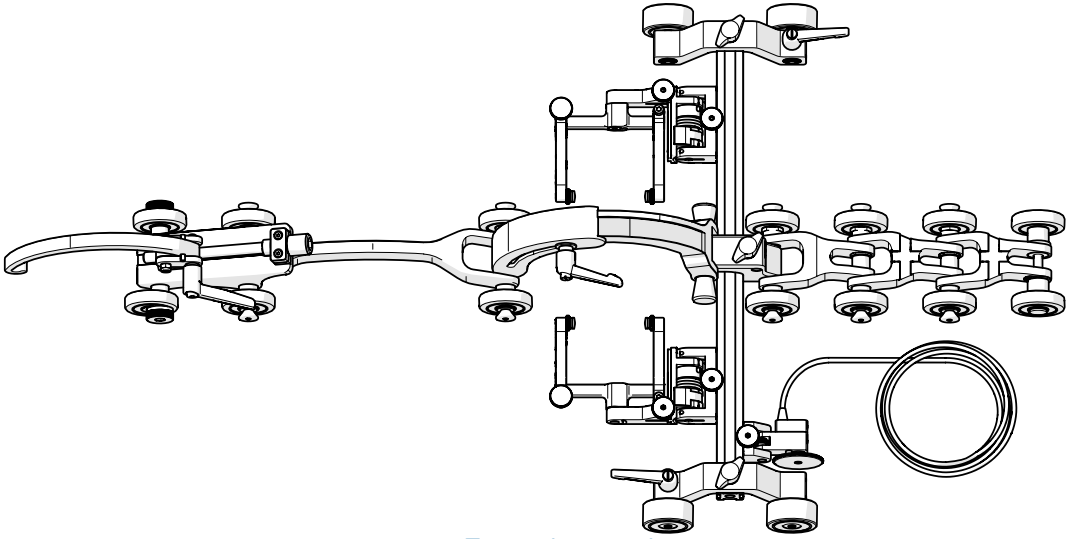


Fig. 7 - Two probe scanning

2.2. Four Probe Scanning

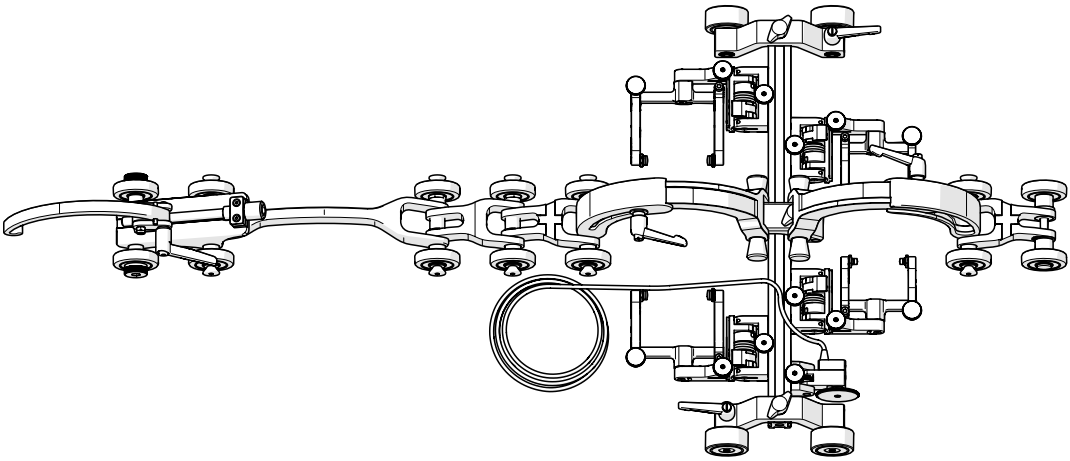


Fig. 8 - Four probe scanning

2.3. Four Probe Cantilever Scanning

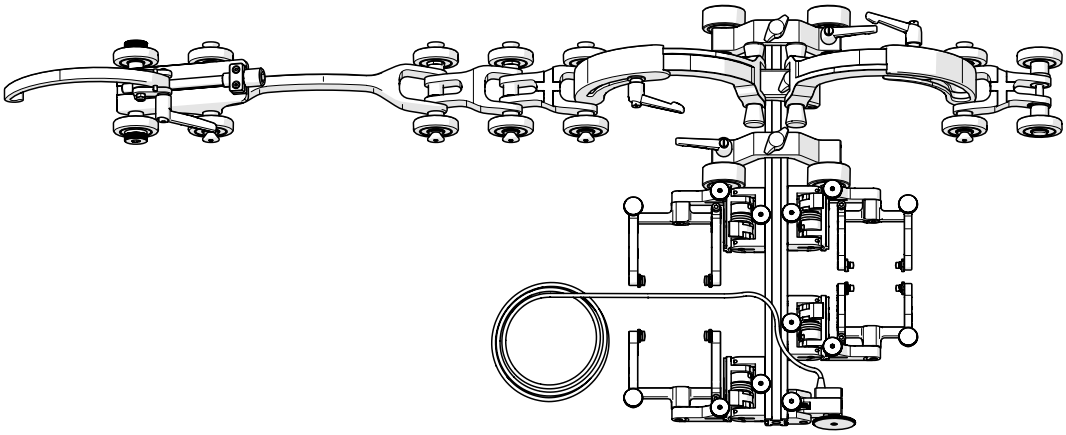


Fig. 9 - Four probe cantilever scanning

3.1. Setup of Rotix on a Scanning Surface

1. Determine the diameter of the pipe or tube to be scanned. Included in the ***ROTIX*** kit and in this manual, are two setup charts which indicate the number of links required based on the diameter of the pipe or tubing *(Fig. 10)*. Refer to the appropriate chart based on the number of probes to be used when scanning.

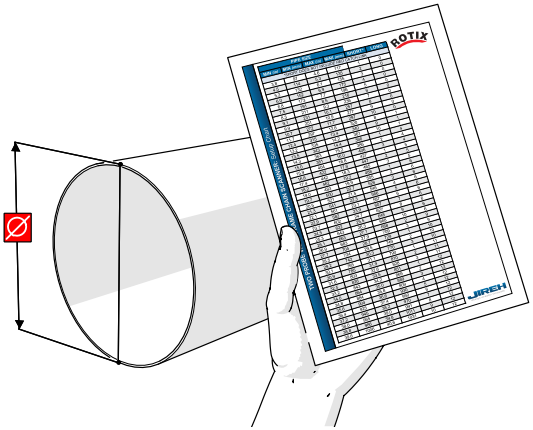


Fig. 10 - Refer to setup chart

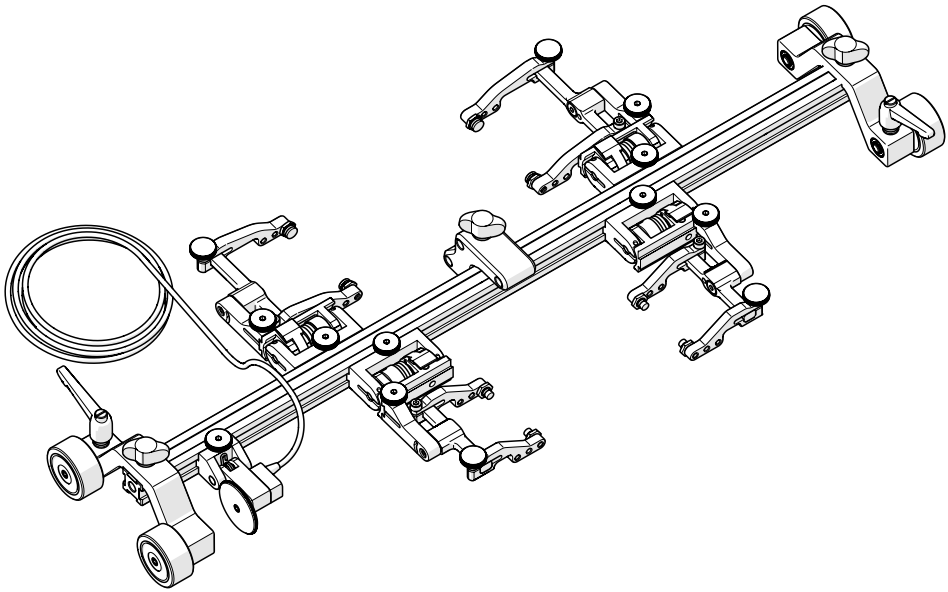


Fig. 11 - Assemble configuration

2. Assemble the appropriate configuration to the frame bar *(Fig. 11)*. Install the wedge and probes that will be used *(see Slip Joint Probe Holder on page 16)*.

TIP: *The following example is a four probe configuration for a 12" pipe diameter.*

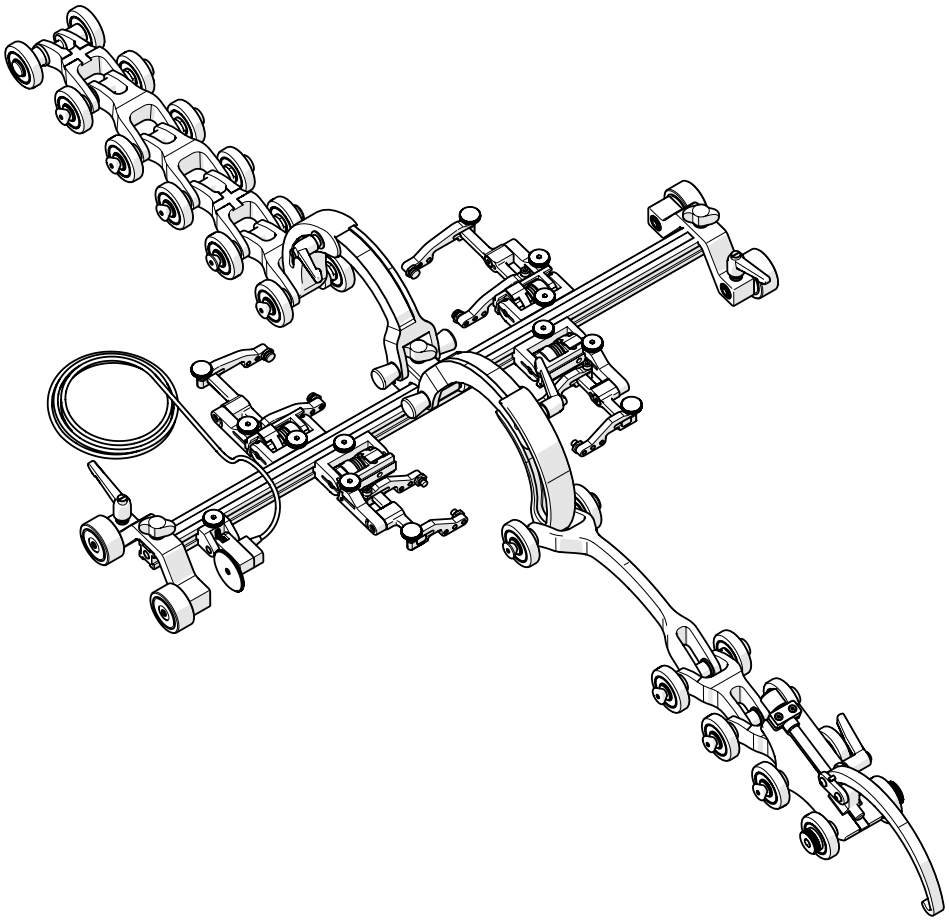


Fig. 12 - Assemble configuration

3. On a flat surface, connect the appropriate number of links *(see Chain Connection on page 15)* as indicated on the ***ROTIX*** setup chart. Arrange the link setup so the buckle and catch link will be 180° opposite of the scanner body *(Fig. 12)*.

   TIP: *Place the dovetail link 2nd in the chain after the overhead adjustable link.*

4. Ensure the crossover wheel brakes are locked *(see Crossover Wheel Block on page 11)*.

5. Drape the configured assembly around pipe/tube to be inspected *(Fig. 13)*. Ensure the scanner's double wheel chain links straddle the weld.

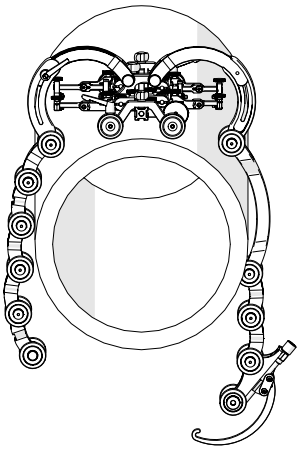


Fig. 13 - Place on pipe

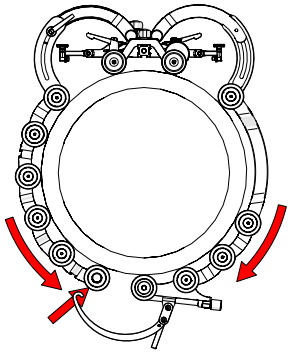


Fig. 14 - Hook buckle to catch link

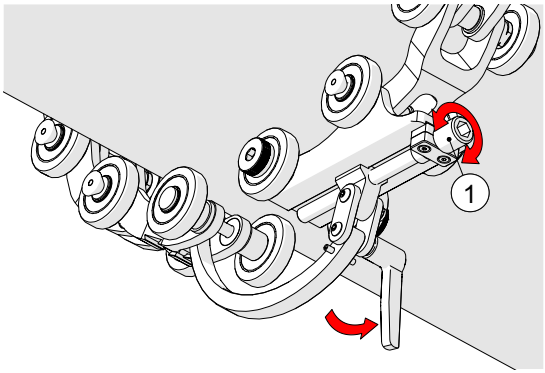


Fig. 15 - Adjust pressure of buckle

6. Bring the buckle arm towards the catch link. Hook the buckle's arm to the middle axle of the catch link *(Fig. 14)*. The buckle adjustment knob *(Fig. 15-1)* may have to be loosened to allow arm to reach catch link *(Fig. 15)*.

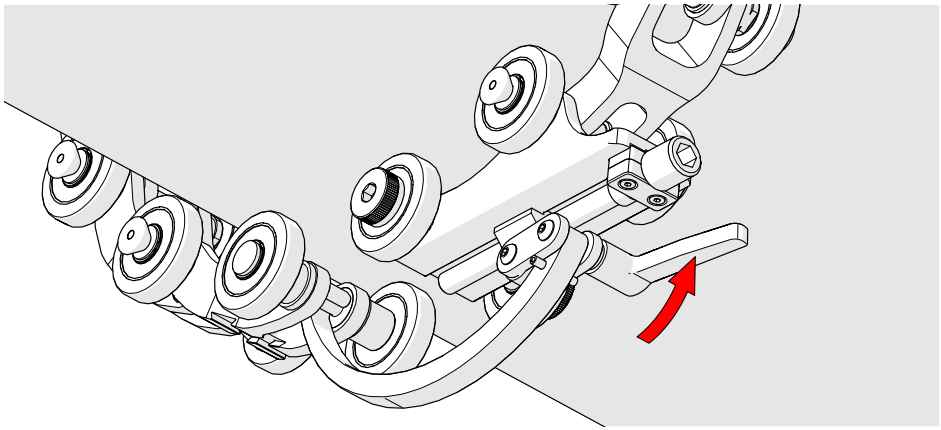


Fig. 16 - Press down to lock

7. Rotate the buckle adjustment knob until the buckle's lever can be pushed down locking the buckle in place *(Fig. 16)*. The tightness of the ***ROTIX*** on the pipe can be adjusted using the buckle adjustment knob *(Fig. 15-1)*.

> ***TIP:*** *If additional clearance is required, the buckle's ratchet lever can be pulled out and rotated to various positions (see Ratchet Lever on page 15).*

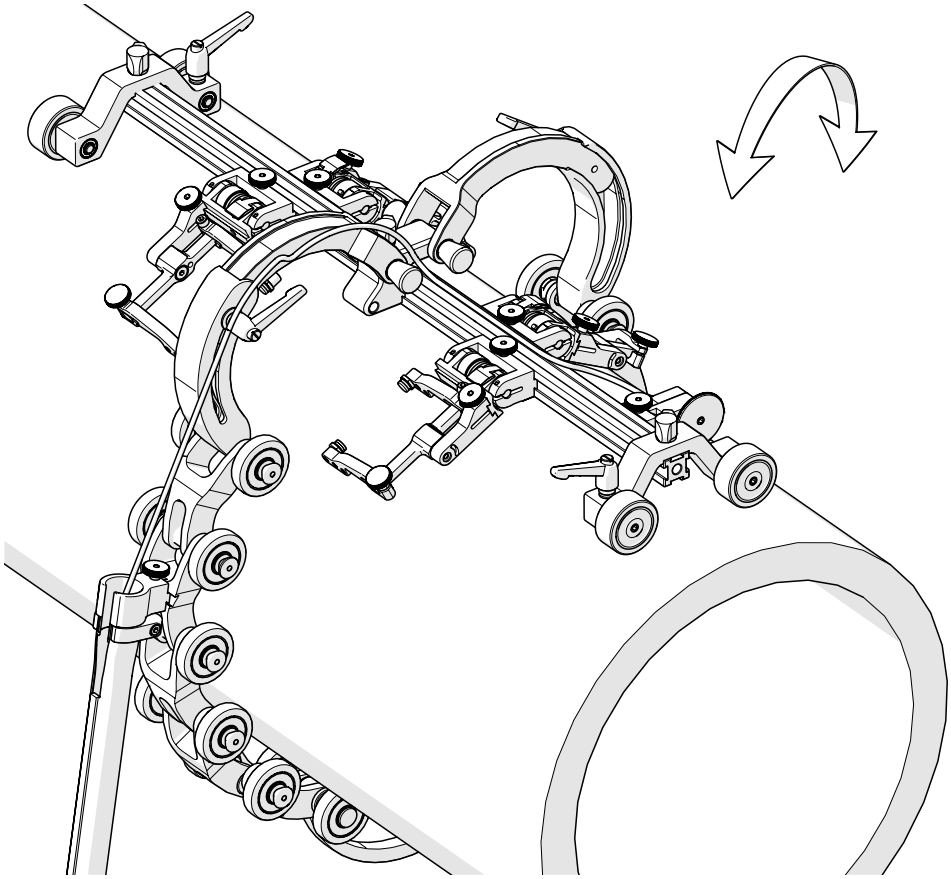


Fig. 17 - Configured four probe configuration

8. Route all cabling and hoses *(Only encoder cable shown)* to the the zipper tube *(see Cable Management System on page 22)*.
9. Lower probe holders to the scan surface *(see Slip Joint Probe Holder on page 16)*.
10. Release the brakes on the crossover wheel blocks to commence scanning *(see Crossover Wheel Block on page 11)*.

4.1. Overhead Adjustable Link

The overhead adjustable link provides clearance for probes and wedges.

When low profile scanning is required, the ratchet lever is adjustable.

Loosen the rachet handle *(Fig. 18)* and extend or retract the link as required. Tighten the rachet handle *(Fig. 19)*.

(see Ratchet Lever on page 15)

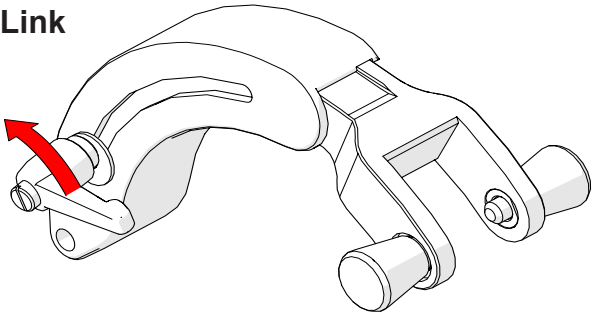


Fig. 18 - Loosen ratchet lever

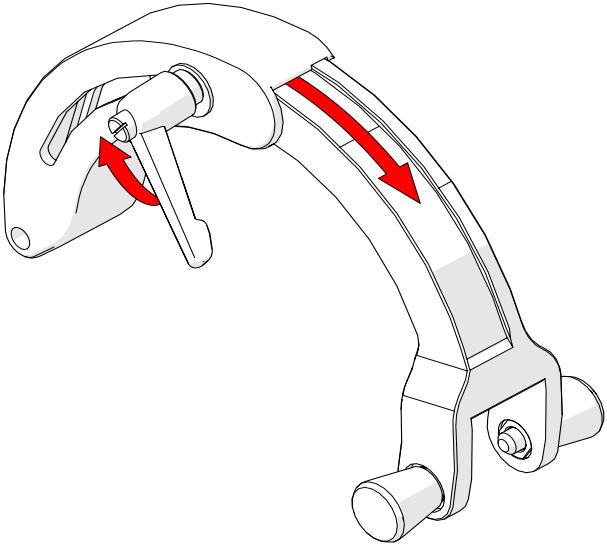


Fig. 19 - Adjust link and tighten rachet lever

4.2. Crossover Wheel Block

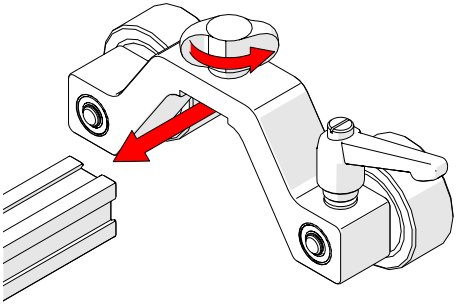


Fig. 20 - Attach to frame bar

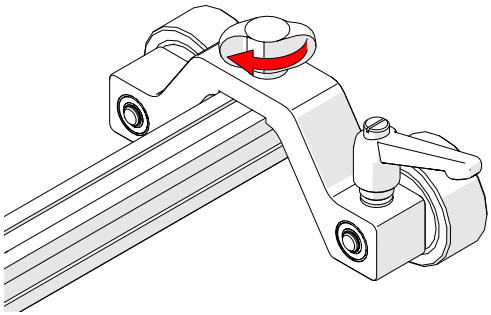


Fig. 21 - Tighten wing knob

The crossover wheel block provides stability and braking to the ***ROTIX*** system.

The ratchet lever located on the crossover wheel block operates the brake.

Install the crossover wheel block by loosening the black wing knob and sliding the crossover wheel block's dovetail nut onto the frame bar *(Fig. 20)*. Tighten the black wing knob *(Fig. 21)*.

4.2.1. Wheel Removal/Installation

Tightly grip the wheel to be removed by hand. Using the supplied 3mm hex driver *(Fig. 1)*, loosen the wheel from the axle.

TIP: *When the brake is engaged and the scanner is moved, this may loosen the wheels from the axle. Grip the wheel tightly and retighten the axle with the 3mm hex driver.*

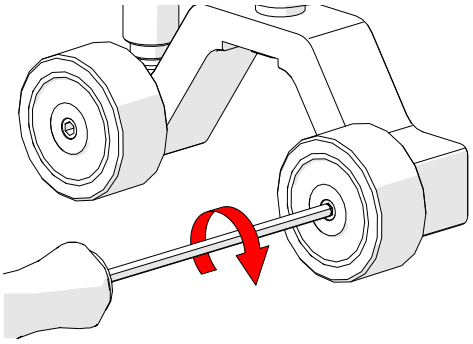


Fig. 22 - Wheel removal/installation

4.3. Double Chain Mount

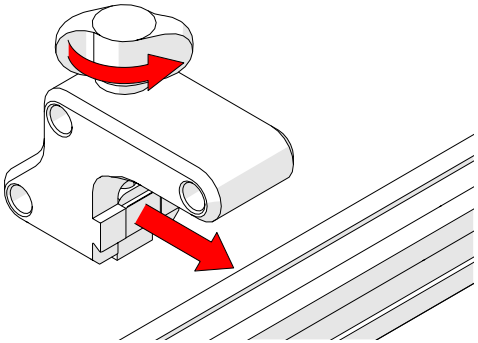


Fig. 23 - Chain mount

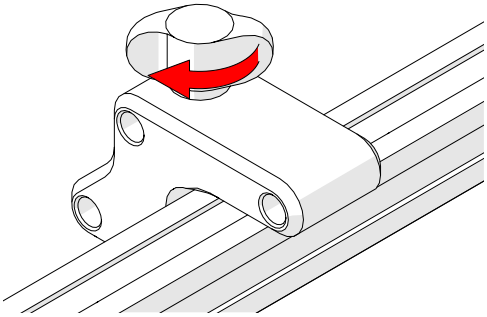


Fig. 24 - Chain mount alignment

The double chain mount provides a connection point for links.

Loosen the double chain mount's dovetail jaw using the black wing knob *(Fig. 23)*. Secure the double chain mount to the frame bar by tightening the black wing knob. *(Fig. 24)*.

4.4. Trailing Encoder

The spring loaded encoder wheel provides vertical travel while maintaining contact pressure to the scan surface. To install the encoder follow these steps:

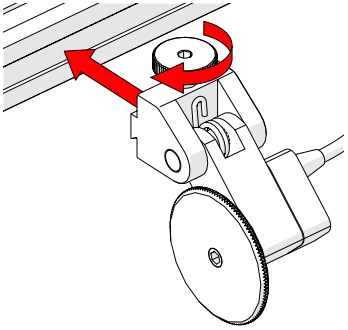


Fig. 25 - Attach to frame bar

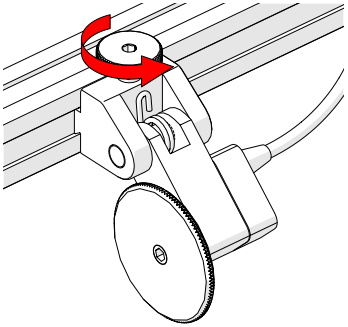


Fig. 26 - Tighten knob

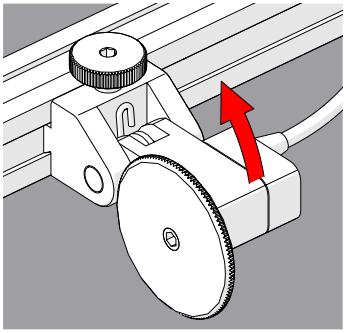


Fig. 27 - Place on scan surface

1. Loosen the encoder's dovetail jaw and mount to the frame bar *(Fig. 25)*.
2. Tighten the encoder knob *(Fig. 26)*.
3. Spring tension maintains encoder contact with the scan surface *(Fig. 27)*.

4.5. Frame Bar

Frame bars *(Fig. 28)* are used to mount probe holders, probe positioning systems and other accessories *(see Frame Bars on page 39)*.

Frame bars are available in a variety of lengths.

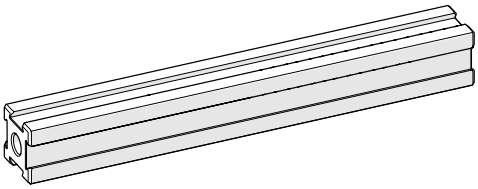


Fig. 28 - Frame bar

4.6. Pivot Buttons

Available in a variety of shapes and sizes fitting various wedge dimensions.

Use the supplied 3/8" wrench *(Fig. 2)* to remove and install pivot buttons *(Fig. 29)*.

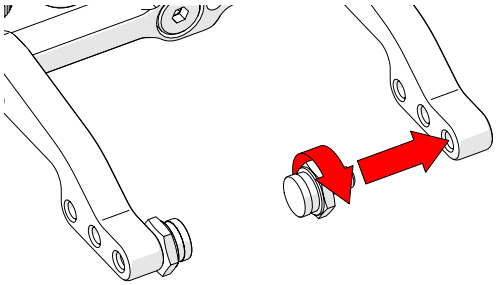


Fig. 29 - Pivot buttons

4.7. Chain Components

The chain components are used to fasten a scanning cart circumferentially around a pipe or tubing.

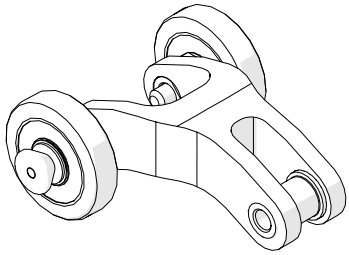


Fig. 30 - Short link

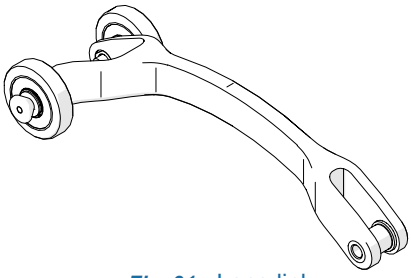


Fig. 31 - Long link

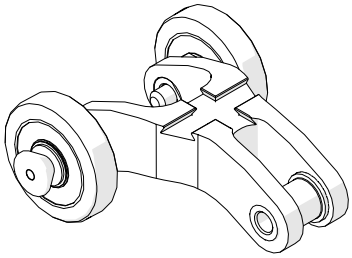


Fig. 32 - Dovetail link

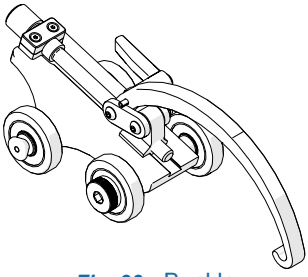


Fig. 33 - Buckle

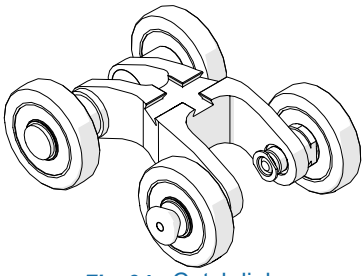


Fig. 34 - Catch link

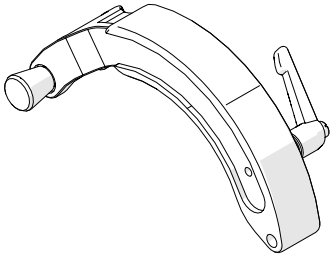


Fig. 35 - Overhead adjustable link

4.7.1. Chain Connection

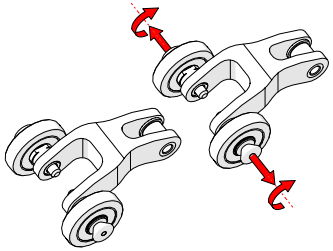


Fig. 36 - Pull out and twist pins

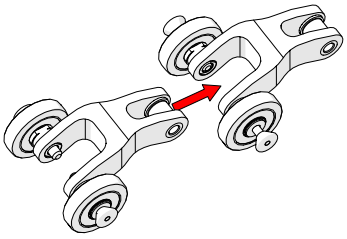


Fig. 37 - Align mounting holes

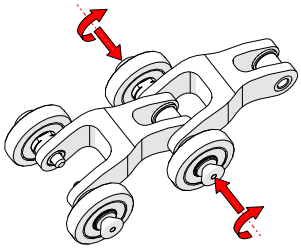


Fig. 38 - Release pins

To connect chain components, see these following steps:

1. Pull the pins out from the wheels, twist a quarter turn latching the pins in a retracted state *(Fig. 36)*.
2. Align the pins with the mounting holes of the component to be connected *(Fig. 37)*.
3. Twist the pins until they unlatch and extend into the hole of the connected component *(Fig. 38)*.

4.8. Ratchet Lever

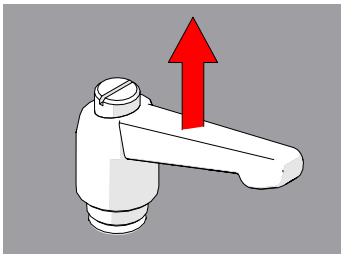


Fig. 39 - Pull ratchet handle

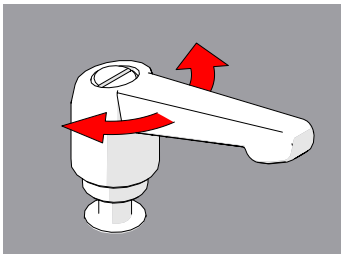


Fig. 40 - Rotate handle

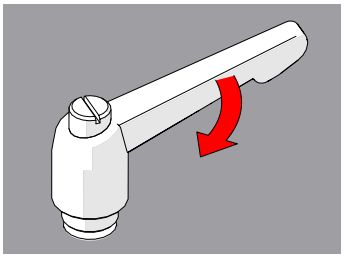


Fig. 41 - Tighten handle

The rachet levers are used for various locking functions on the ***ROTIX*** system. Occasionally, movement of the lever locking position is required. The lever placement can be adjusted by following these steps:

1. Pull the ratchet lever away from the base of which it is connected *(Fig. 39)*.
2. Continue to pull while rotating the lever in the appropriate direction *(Fig. 40)*.
3. Release the lever and utilize the new tightening position.

4.9. Slip Joint Probe Holder

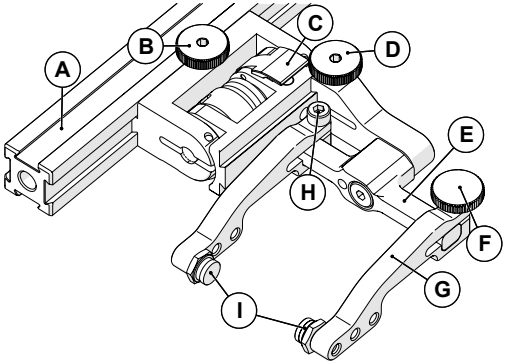


Fig. 42 - Slip Joint Probe Holder

A	Frame Bar
B	Probe Holder Adjustment Knob
C	Latch
D	Swing Arm Knob
E	Yoke
F	Probe Holder Arm Adjustment Knob
G	Probe Holder Arm
H	Arm Clamp Screw
I	Pivot Buttons

4.9.1. Probe Holder Setup

To mount a UT wedge in the probe holder, follow these steps:

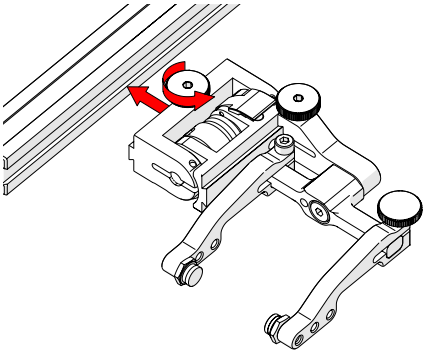


Fig. 43 - Attach to frame bar

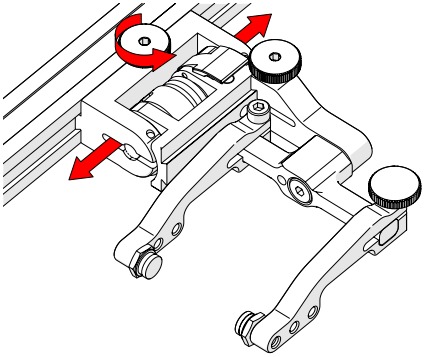


Fig. 44 - Adjust on frame bar

1. Rotate the probe holder adjustment knob and attach probe holder to a frame bar *(Fig. 43)*.
2. Use the probe holder adjustment knob to position the probe holder along the frame bar *(Fig. 44)*.

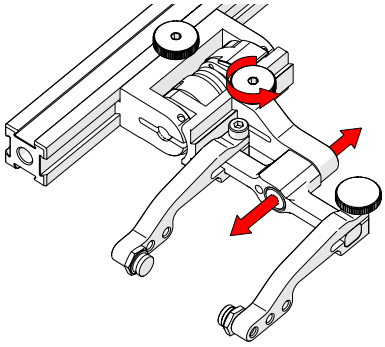


Fig. 45 - Adjust swing arm

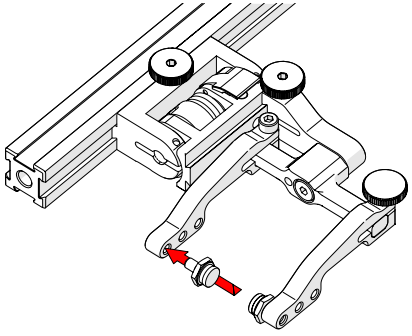


Fig. 46 - Place pivot buttons

3. Use swing arm knob to position the swing arm *(Fig. 45)*.

> ***TIP:*** *The swing arm is typically used to adjust TOFD center to center distance relative to the phased array probes on a four probe configuration (Fig. 8).*

4. Using the supplied 3/8" wrench *(Fig. 2)*, place the pivot buttons as required *(Fig. 46)*.

> ***TIP:*** *If narrow scanning footprint is required, use pivot button holes closest to the yoke. Wedge pivoting may be impeded when closer to the yoke.*

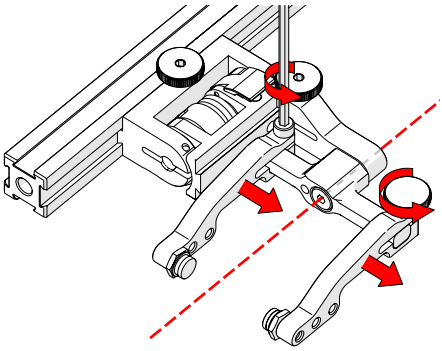


Fig. 47 - Adjust probe holder arms

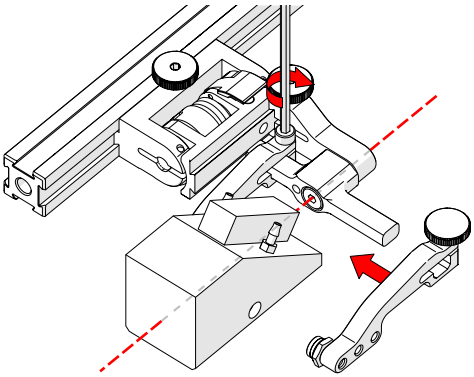


Fig. 48 - Place wedge

5. Loosen the probe holder arm adjustment knob *(Fig. 47)* and remove outer probe holder arm from yoke.
6. Adjust inner probe holder arm as required to best centre the probe on the yoke's pivot axis *(Fig. 47)*.

> ***TIP:*** *The probe holder yoke can accommodate many different probe and wedge sizes of varying widths. It is best to centre the wedge with the yoke's pivot axis to reduce wedge tipping when scanning. Position the inner probe holder arm accordingly with the centre of the yoke (Fig. 47).*

7. Position the wedge on the inner probe holder arm *(Fig. 48)*.
8. Slide outer probe holder arm along the yoke pinching the wedge in place.
9. Tighten probe holder arm adjustment knob *(Fig. 49)*.

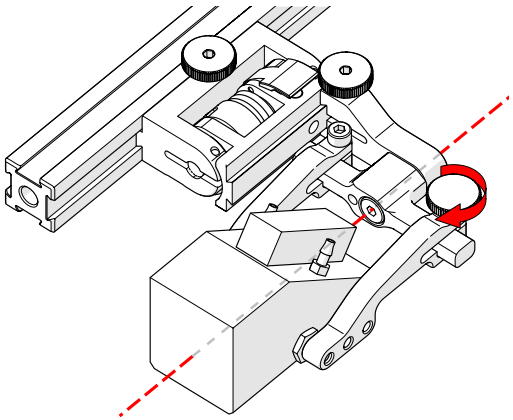


Fig. 49 - Pinch wedge with arm

4.9.2. Probe Holder Adjustment

To adjust the probe holder, follow these steps:

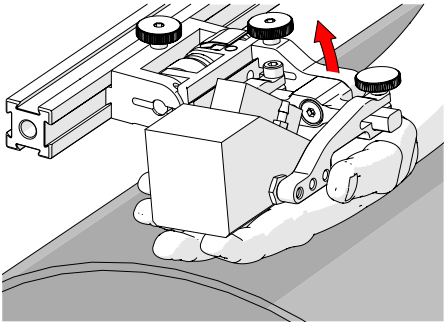


Fig. 50 - Lift to Latched position

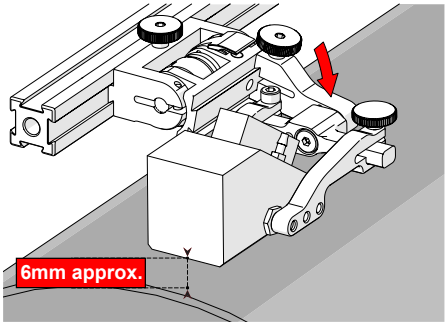


Fig. 51 - Lower to scanning surface

1. Ensure probe holder is in latched, upper position *(Fig. 50)*. If the probe holder is already latched, it will only move within the slip joint adjustment range and have no spring tension.
2. Push the probe holder yoke down toward inspection surface until the wedge is approximately 6 mm *(¼")* above the inspection surface *(Fig. 51)*.

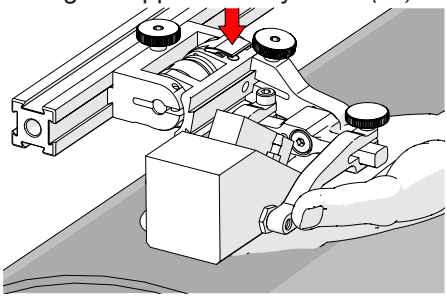


Fig. 52 - Lift and press latch button

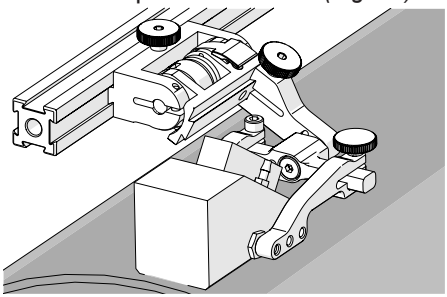


Fig. 53 - Spring loaded scan position

3. Lift probe slightly and press latch button *(Fig. 52)* to apply spring pressure to the wedge.
4. Gently lower probe holder and wedge to the scanning surface *(Fig. 53)*.

4.9.3. Probe Holder Force Adjustment

It is possible to adjust the tension of the probe holder spring.

NOTE: *To perform this operation the 2 mm hex wrench (Fig. 4) and 3 mm hex wrench (Fig. 6) is required.*

Light	1 kg	2 lb
Medium	2 kg	4 lb
Heavy	3 kg	6 lb

When configured correctly, these settings exert the indicated spring force on the Probe.

To adjust the probe holder's force, follow these steps:

***NOTE:** Do not perform this operation on scanning surface.*

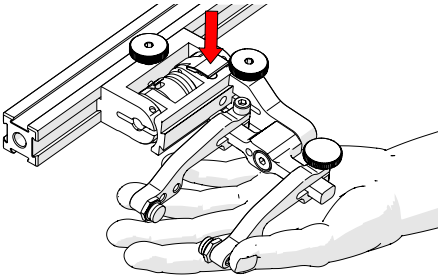


Fig. 54 - Lift slightly and press Latch

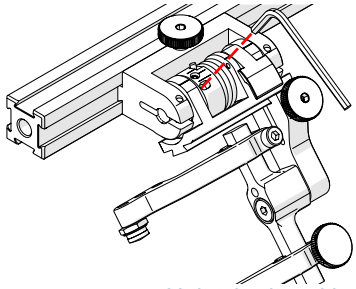


Fig. 55 - Unlatched position

1. Ensure the probe holder is in the upright latched position *(Fig. 50)*.
2. Lift probe holder slightly and press the latch button *(Fig. 54)* to release the probe holder the full 45° degrees.
3. Insert the short arm of a 3 mm hex wrench into the 3 mm slot *(Fig. 55)*.

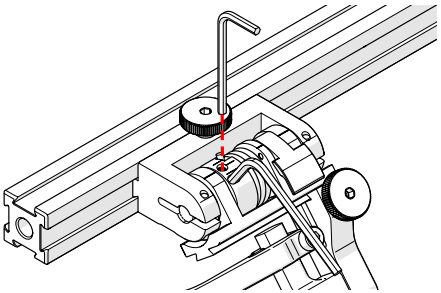


Fig. 56 - Insert hex wrenches

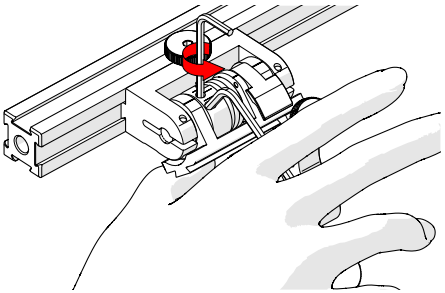


Fig. 57 - Press 3 mm hex wrench down

4. Place the 2 mm hex wrench into the force adjustment screw *(Fig. 56)*.
5. Lightly press the long arm of the 3 mm hex wrench down. Using the 2 mm hex wrench, loosen the force adjustment screw but do not remove it *(Fig. 57)*.
6. Gently apply pressure on the long leg of the 3 mm hex wrench until the force adjustment marker lines up with the desired spring tension. While keeping the markers in line, tighten the force adjustment screw *(Fig. 58)*.

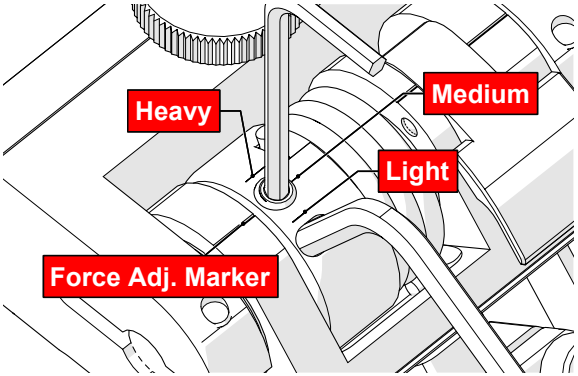


Fig. 58 - Choose desired tension

4.9.4. Slip Joint Probe Holder Left/Right Conversion

To reverse the probe holder, follow these steps:

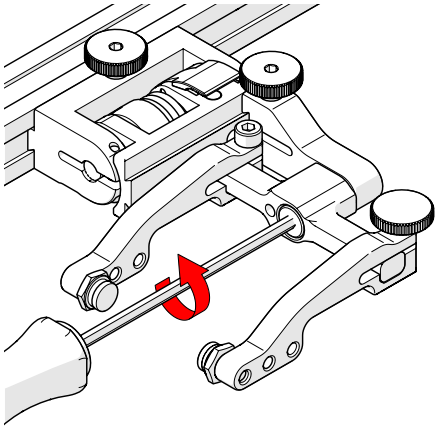


Fig. 59 - Unscrew yoke pivot screw

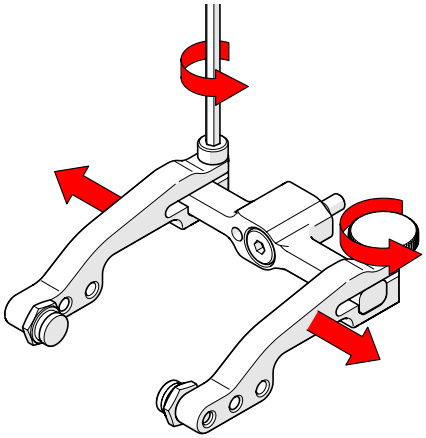


Fig. 60 - Remove arms

1. Unscrew the yoke from the swing arm *(Fig. 59)*.
2. Loosen the probe holder arm adjustment knob and arm clamp screw. Slide the arms from the yoke *(Fig. 60)*.

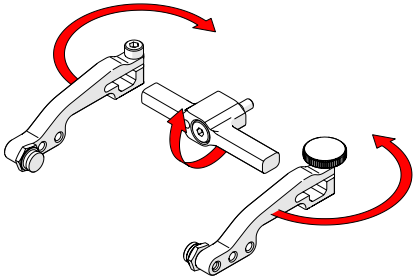


Fig. 61 - Flip yoke and reverse arms

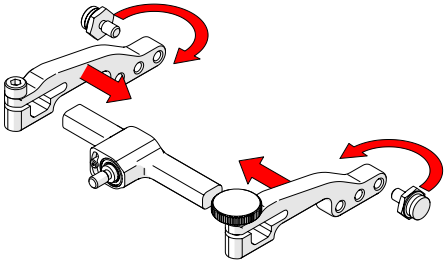


Fig. 62 - Attach arms and move buttons

3. Flip the yoke 180° and reverse the probe holder arms *(Fig. 61)*.
4. Place the pivot buttons on the inside of the probe holder arms *(Fig. 62)* using a 3/8 in wrench *(Fig. 2)*. Slide the arms onto the yoke and tighten the probe holder arm adjustment knob and the arm clamp screw.

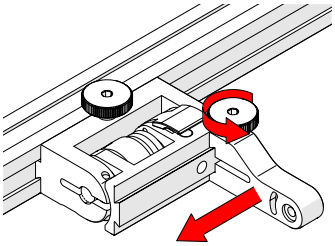


Fig. 63 - Position swing arm

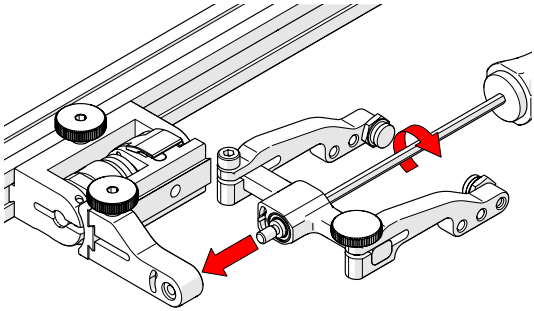


Fig. 64 - Install yoke to swing arm

5. Loosen the swing arm knob and slide the swing arm to the opposite end of the probe holder bracket *(Fig. 63)* or preferred position. Tighten swing arm knob.
6. Using the 3 mm hex driver, screw the yoke pivot screw into the opposite side of the probe holder swing arm *(Fig. 64)*. Ensure the yoke is level to avoid issues with the plunger/set screw.

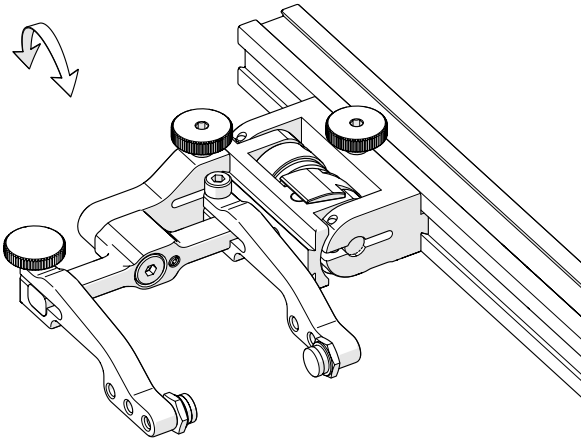


Fig. 65 - Reversed probe holder

4.10. Cable Management System

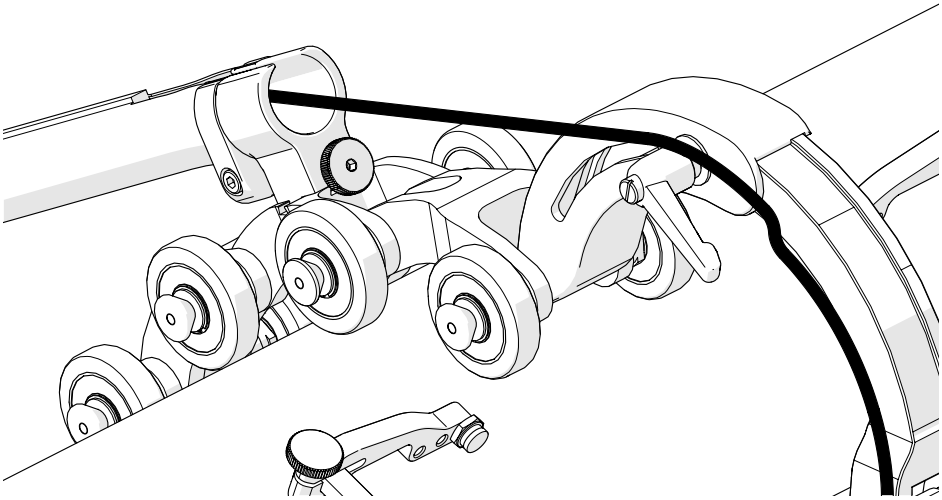


Fig. 66 - Cable management

TIP: *When using the zipper tube, ensure the dovetail link is placed 2nd in the chain behind the overhead adjustable link.*

4.10.1. Zipper Tube Dovetail Mount

To attach a zipper tube for cable management, follow these steps:

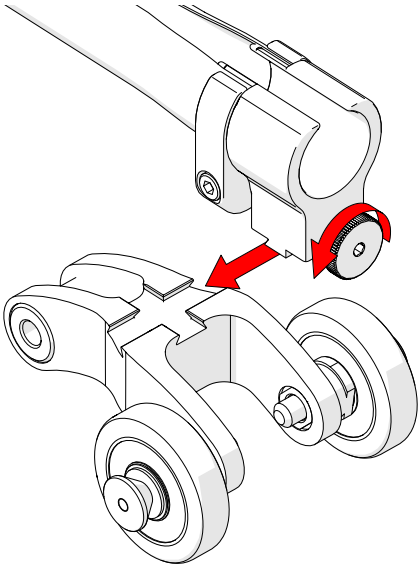


Fig. 67 - Loosen and slide on

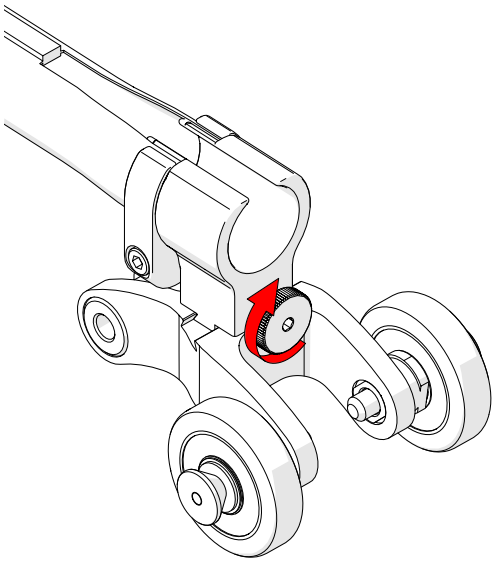


Fig. 68 - Tighten knob

1. Loosen the knob on the zipper tube dovetail mount. Slide the mount onto the dovetail link *(Fig. 67)*.
2. Once centred on the dovetail link, tighten the zipper tube's dovetail mount knob *(Fig. 68)*.

4.10.2. Zipper Tube Setup

The zipper tube option is offered in a variety of lengths and provides a means of bundling and protecting cables and hoses that run to the scanner.

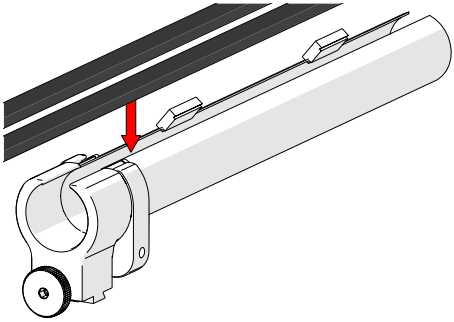


Fig. 69 - Insert cables and hoses

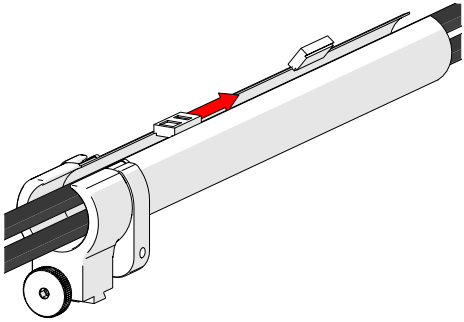


Fig. 70 - Zip up to close

1. Open the zipper tube. Begin at the tube's dovetail mount and place the cabling in the tube *(Fig. 69)*.
2. Follow the cable placement zipping the tube closed *(Fig. 70)*.

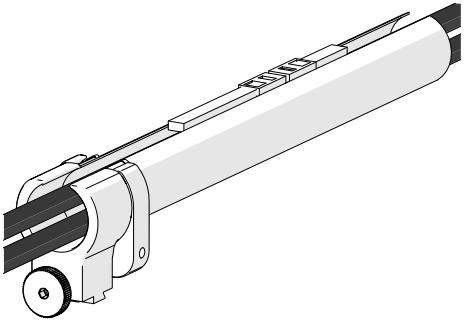


Fig. 71 - Zip opposite end

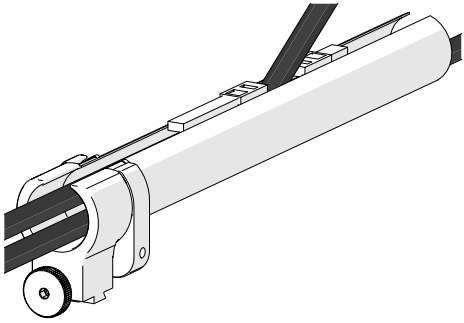


Fig. 72 - Flexibility

3. Once the cable is placed the entire length of tube, bring the zipper from the tubes opposite end, meeting at any point in the middle *(Fig. 71)*.
4. When necessary, the two zippers may be opened to allow any cables to exit the tube anywhere between the ends *(Fig. 72)*.

4.10.3. Clamp Setup

If the tube becomes disconnected from the zipper tube dovetail mount, follow these instructions to re-attach the tube and dovetail mount.

1. Loosen the clamp screw using the supplied 3 mm hex driver.
2. Slide the clamp around the tube first and then slide the tube around the outside of the zipper tube dovetail mount *(Fig. 73)*. Align the zipper opening and the zipper tube dovetail mount opening.
3. Slide the clamp over the tube and zipper tube dovetail mount pinching the tube in between *(Fig. 74)*.
4. Tighten the clamp screw *(Fig. 75)*.

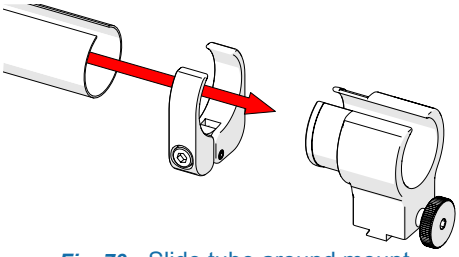


Fig. 73 - Slide tube around mount

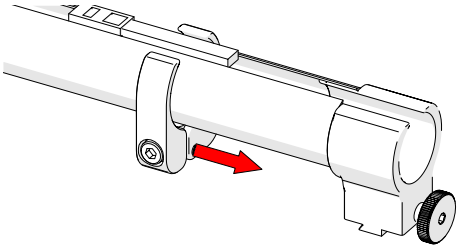


Fig. 74 - Slide clamp onto mount

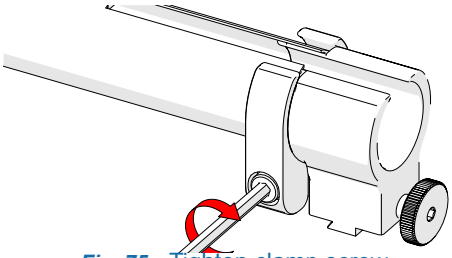


Fig. 75 - Tighten clamp screw

4.11. Reduced Width Scanning Kit

The encoded probe holding link houses the main encoder and provides a mounting base for probe holders.

To mount/adjust the frame bar, loosen the bar adjustment knobs, insert bar, slide to desired placement, then tighten bar adjustment knobs.

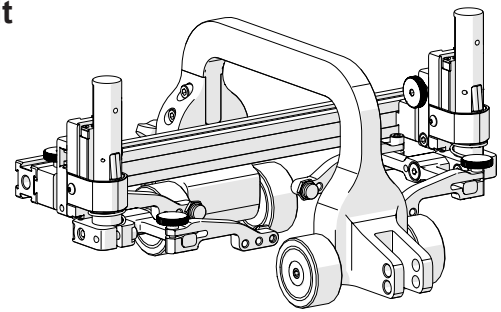


Fig. 76 - Reduced width scanning kit

4.12. Vertical Probe Holder

A	Latch
B	Probe Holder Adjustment Knob
C	Vertical Adjustment Knob
D	Pivot Buttons
E	Probe Holder Arms
F	Yoke
G	Probe Holder Arm Adjustment Knob
H	Transverse Adjustment Screw
I	Frame Bar

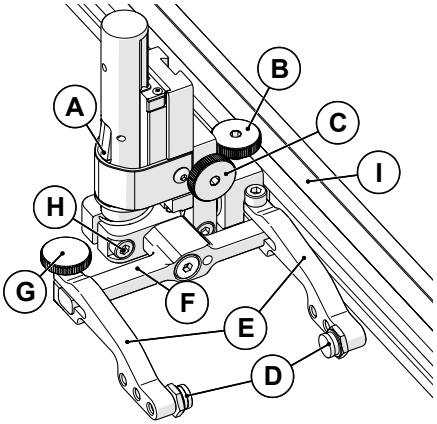


Fig. 77 - Vertical probe holder

4.12.1. Probe Holder Setup

To mount a UT wedge in the probe holder, follow these steps:

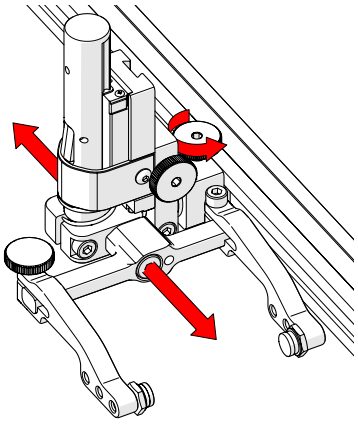


Fig. 78 - Adjust on frame bar

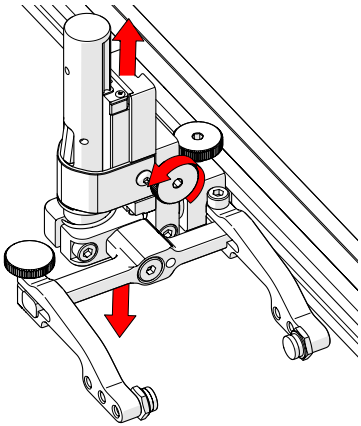


Fig. 79 - Vertical adjustment

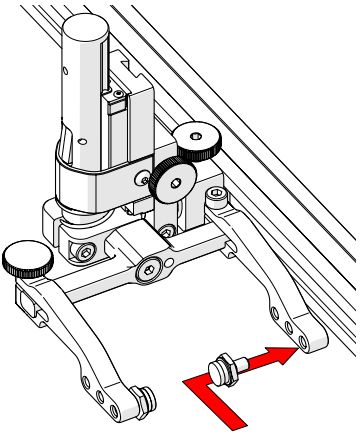


Fig. 80 - Place buttons

1. The probe holder adjustment knob allows the probe holder to be attached to a frame bar, as well as horizontal positioning on a frame bar *(Fig. 78)*.
2. Vertical adjustment knob allows the vertical probe holder height adjustment *(Fig. 79)*.
3. Position the pivot buttons where necessary, When narrow scanning foot-print is required, use the pivot button holes closets to the yoke *(Fig. 80)*.

TIP: *Probe pivoting may be impeded when closer to the yoke.*

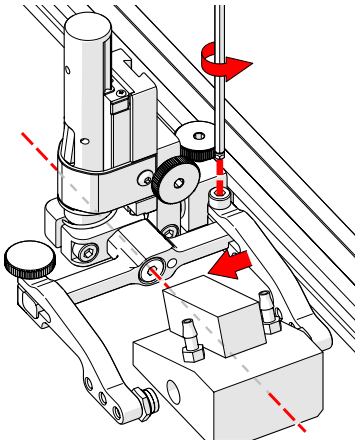


Fig. 81 - Adjust inner arm

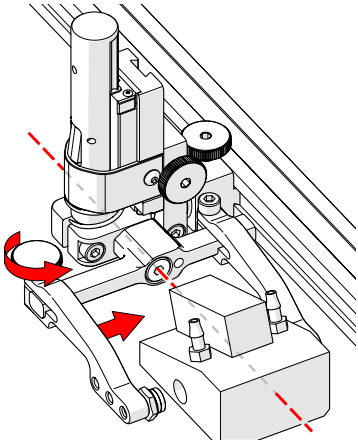


Fig. 82 - Adjust outer arm

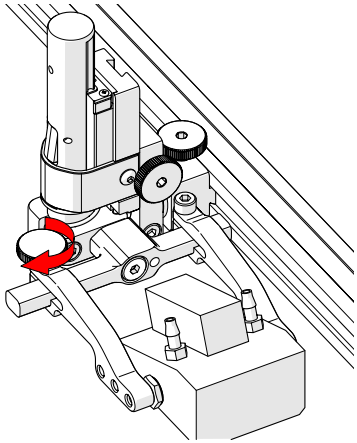


Fig. 83 - Tighten arm knob

4. Position the wedge on the inner probe holder arm.

> ***TIP:*** *The probe holder yoke can accommodate many different probe and wedge sizes of varying widths. It is best to centre the wedge with the yoke's pivot axis. This can reduce wedge tipping when scanning. Position the inner probe holder arm accordingly (Fig. 81) using the supplied 3 mm hex driver (Fig. 1).*

5. Loosen the probe holder arm adjustment knob *(Fig. 82)* and slide the probe holder arm along the yoke pinching the wedge in place.

6. Tighten the probe holder arm adjustment knob *(Fig. 83)*.

4.12.2. Probe Holder Vertical Adjustment

To adjust the probe holder vertically, follow these steps:

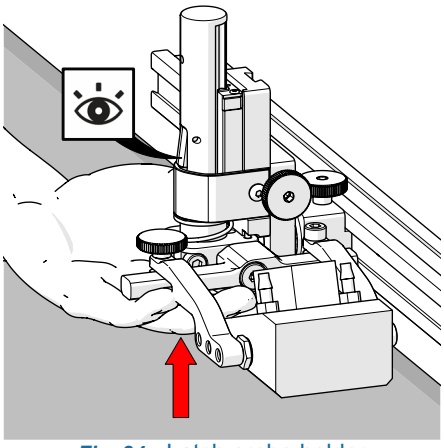


Fig. 84 - Latch probe holder

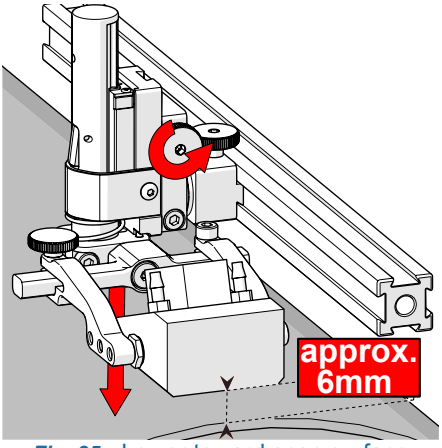


Fig. 85 - Lower toward scan surface

1. Ensure the probe holder is in the latched, upper position. Lift the probe holder until the latch is fully exposed and snaps out to lock *(Fig. 84)*.

2. Loosen the vertical adjustment knob and slide the probe holder down until the wedge is approximately 6 mm *(¼ in)* above inspection surface *(Fig. 85)*.
3. Tighten the vertical adjustment knob *(Fig. 85)*.

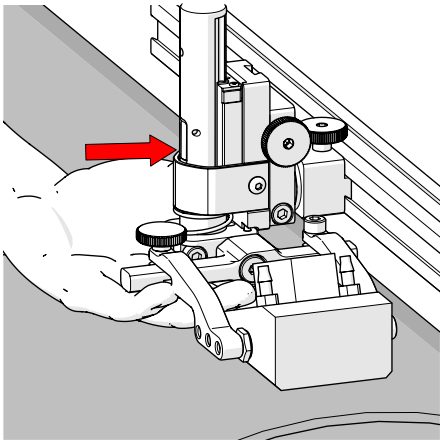


Fig. 86 - Press latch button

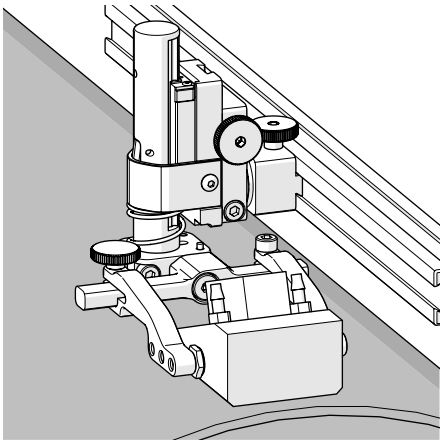


Fig. 87 - Lower toward scan surface

4. Lift the yoke slightly and press the latch button *(Fig. 86)*, then slowly lower towards scanning surface to apply spring pressure to the wedge *(Fig. 87)*.

> ***TIP:*** *If less spring force is desired, refer to step 2 and place the wedge approximately 20 mm (¾ in) above inspection surface.*

4.12.3. Probe Holder Transverse Adjustment

To adjust the probe holder's transverse angle, follow these steps:

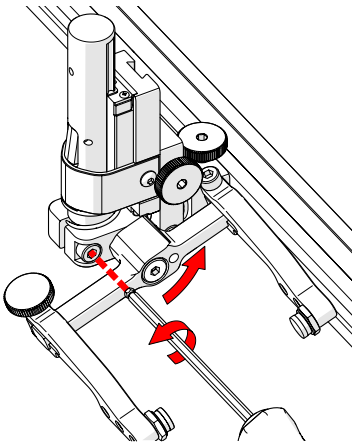


Fig. 88 - Loosen 3 mm screw

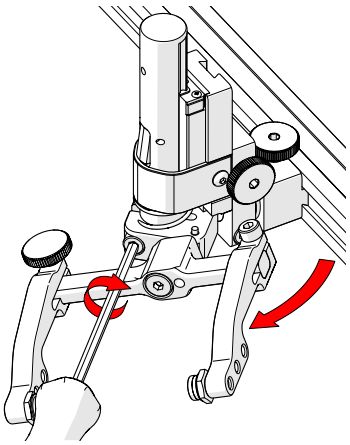


Fig. 89 - Rotate and tighten

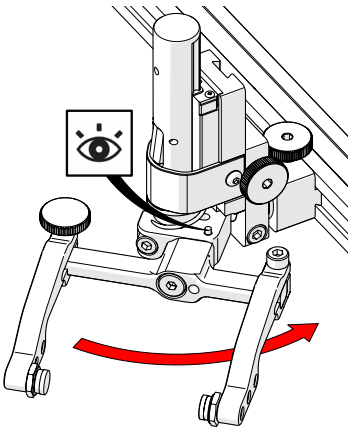


Fig. 90 - Stop post locates 90°

1. Ensure the probe holder is in latched, upper position *(Fig. 84)*.

2. Using the supplied 3 mm hex driver loosen the transverse adjustment screw *(Fig. 88)* and rotate the yoke about the vertical shaft achieving the desired angle.
3. Tighten the transverse adjustment screw *(Fig. 89)*.

To return the transverse adjustment to neutral (90°). The probe holder must be in the latched, upper position *(Fig. 84).* Rotate the yoke until the stop post contacts the base of the probe holder *(Fig. 90).* Then tighten the transverse adjustment screw.

4.12.4. Probe Holder Longitudinal Adjustment

To adjust the probe holder's vertical angle for longitudinal scanning, follow these steps:

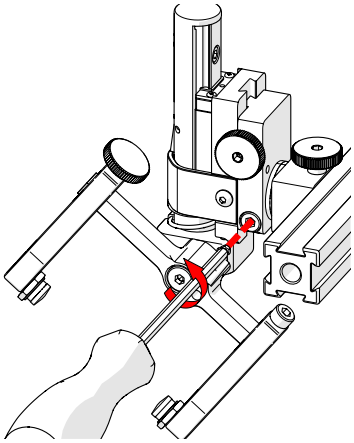


Fig. 91 - Loosen 3 mm screw

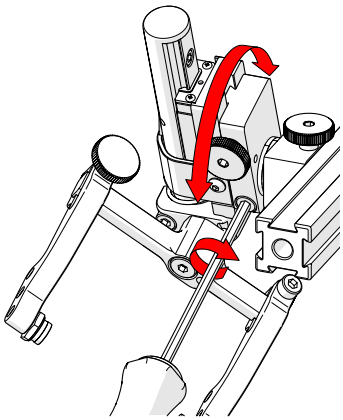


Fig. 92 - Rotate to position

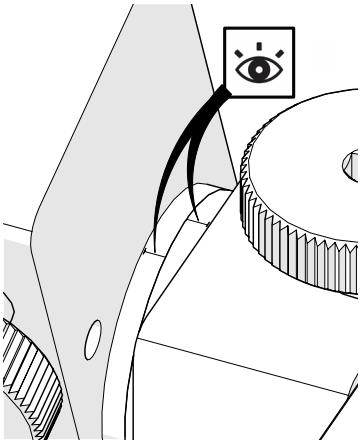


Fig. 93 - Line up markers

1. Ensure the probe holder is in latched, upper position *(Fig. 84).*
2. Using the supplied 3 mm hex driver *(Fig. 1)*, loosen the longitudinal adjustment screw *(Fig. 91).*
3. Rotate the main body of the probe holder until it is at the desired angle.
4. Tighten the longitudinal adjustment screw *(Fig. 92).*

To return the longitudinal adjustment to neutral (90°). Line up the longitudinal adjustment indicator markers *(Fig. 93).*

4.12.5. Probe Holder Left/Right Conversion

To reverse the probe holder, follow these steps:

NOTE: *To perform this operation the 1.5 mm hex wrench (Fig. 3) is required.*

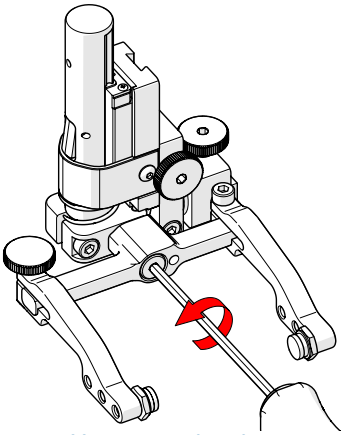


Fig. 94 - Unscrew yoke pivot screw

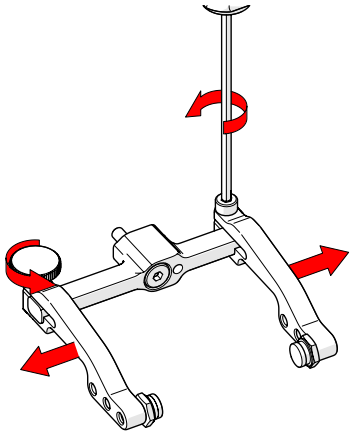


Fig. 95 - Remove probe holder arms

1. Ensure the probe holder is in latched, upper position *(Fig. 84)*.
2. Using the supplied 3 mm hex driver *(Fig. 1)*, unscrew the yoke pivot screw and remove yoke *(Fig. 94)*.
3. Loosen the probe holder arm adjustment knob and the arm clamp screw. Slide the probe holder arms off the yoke *(Fig. 95)*.

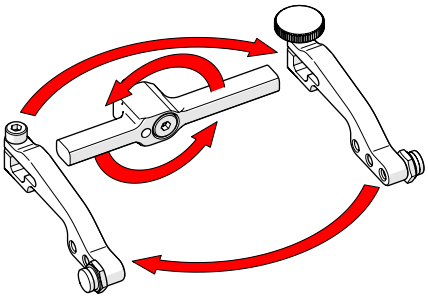


Fig. 96 - Flip yoke and reverse arms

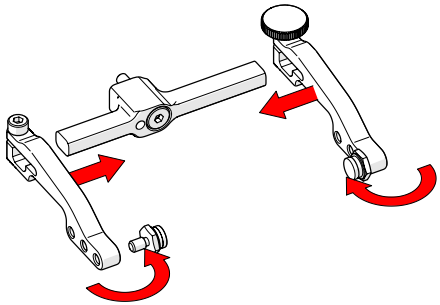


Fig. 97 - Attach arms & move buttons

4. Flip the yoke 180° and swap the probe holder arms *(Fig. 96)*.
5. Place the pivot buttons on the inside of the probe holder arms *(Fig. 97)* using a 3/8 in wrench *(Fig. 2)*.

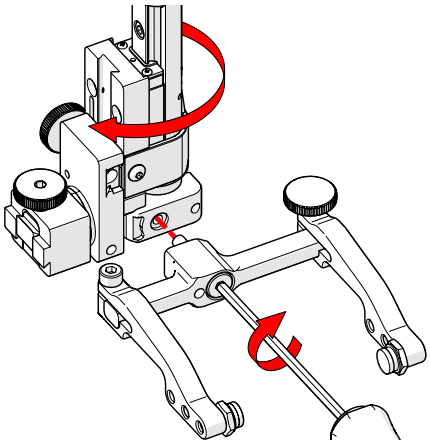


Fig. 98 - Screw yoke to opposite side

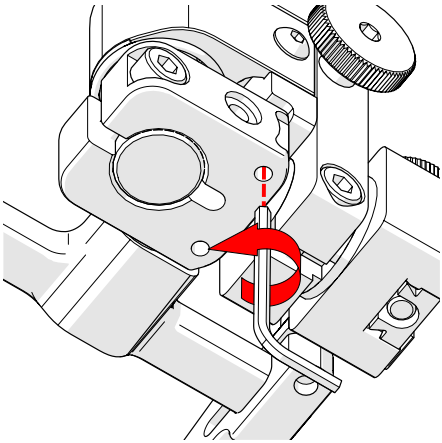


Fig. 99 - Lower 90° stop post

6. Mount the yoke to the opposite side of the base using the supplied 3 mm hex driver *(Fig. 98)*.

> ***TIP:*** *Keep the yoke level with the base as to ensure no conflicts with the plunger/set screw attached to the yoke.*

7. Locate the recessed M3 screw *(stop post)* on the bottom of the probe holder. Unscrew the stop post using a 1.5 mm hex wrench until it has cleared all obstructions. Do not remove stop post *(Fig. 99)*.

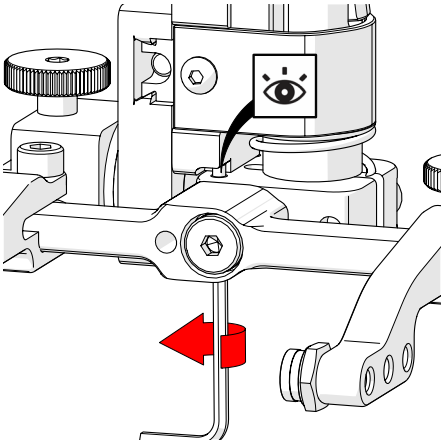


Fig. 100 - Raise opposite 90° stop post

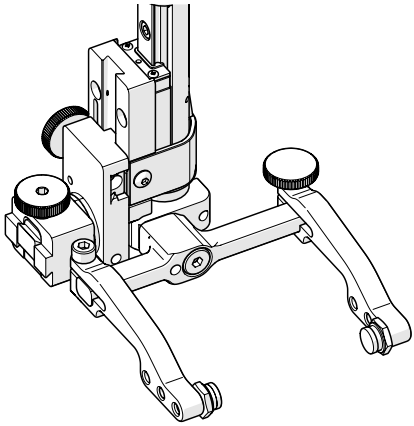


Fig. 101 - Reversed probe holder

8. Raise the stop post on the opposite side until the side of the post clearly contacts the 90° stop point on the probe holder's base *(Fig. 100)*.

4.13. Magnetic Wheel Kit

WARNING! MAGNETIC MATERIAL. The magnetic wheel kit produce a magnetic field which may cause failure or permanent damage to items such as watches, memory devices, CRT monitors, medical devices or other electronics. People with pacemakers or ICD's must stay at least 25 cm *(10 in)* away.

When the use of a chain scanner is not appropriate, the magnetic wheel kit *(Fig. 102)* can be used to replace the urethane wheels on a ***ROTIX*** scanner body. Two sets of the magnetic wheel kits can also be used on the scanner body to double the magnetic force.

To install or remove wheels *(see Crossover Wheel Block on page 11)*.

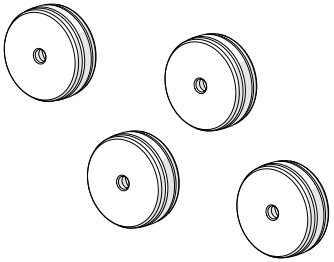


Fig. 102 - Magnetic wheel kit

NOTE: *Do not use the magnetic wheels in conjunction with a chain assembly.*

NOTE: *Magnetic wheels may lose their magnetic properties if heated above 175°F (80° C).*

4.14. Pre-amp Bracket

The pre-amp bracket mounts to any dovetail groove to hold a pre-amp. Compatible with most standard pre-amps, use the adjustable screw mounting channel on the bottom of the bracket to attach a pre-amp. The pre-amp bracket may also be ordered with velcro straps which are used to hold the pre-amp.

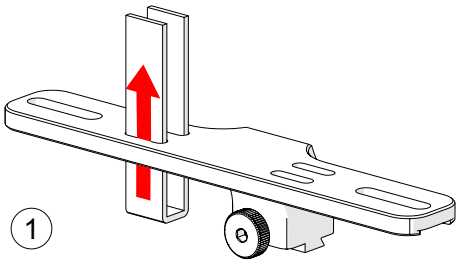


Fig. 103 - Insert velcro straps

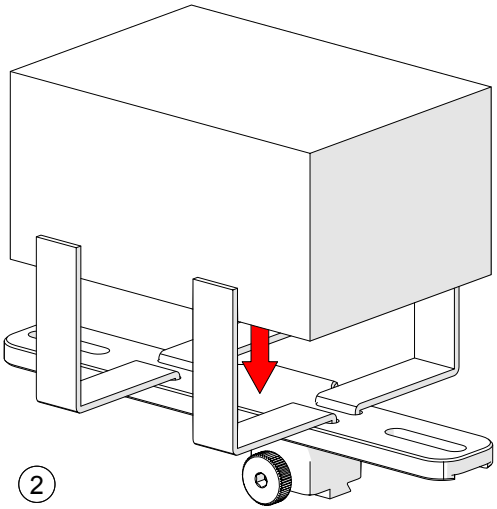


Fig. 104 - Place pre-amp and wrap velcro

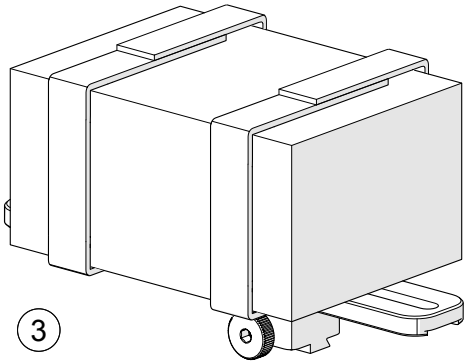


Fig. 105 - Mount bracket on a frame bar

5. Troubleshooting

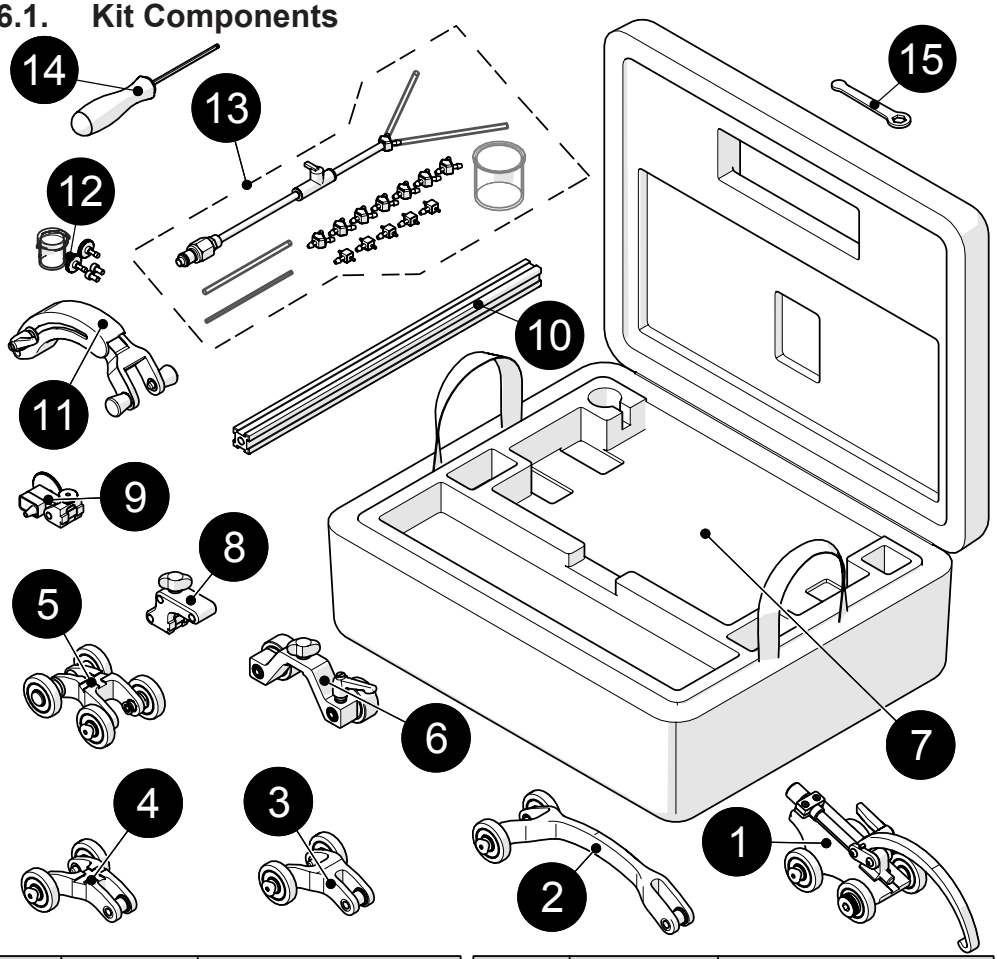
Problem	Possible Cause	Solution
1. Chain is too loose/tight	Incorrect number or combination of links for proper scanner configuration.	Refer to the ***ROTIX*** setup chart *(see Two Probe Chain Configuration Setup Chart on page 3)* or *(see Four Probe Chain Configuration Setup Chart on page 4)* for required number of links for the diameter of pipe/tube that is to be scanned. Ensure the correct outer diameter measurement of the pipe/tube. Reset the scanner with the correct number of links.
	Buckle is incorrectly setup.	Adjust tightness of buckle *(see Operation 4.1. Section 6 on page 13)*
2. Insufficient probe contact.	Scanner not set properly.	Reconfigure the scanner as per instructions *(see Probe Holder Adjustment on page 18)*

6. Spare Parts

To order accessories or replacement parts for your ***ROTIX*** system.
(contact Jireh Industries Ltd. on page i)

NOTE: *These drawings are for parts order. This is not a list of kit contents.*

6.1. Kit Components



BOM ID	Part #	Description
1	CES036	Buckle
2	CES034	Long Link
3	CES033	Short Link
4	CES040	Dovetail Link
5	CES035	Catch Link
6	CES042	Crossover Wheel Block
7	CEA011	Rotix Case

BOM ID	Part #	Description
8	CES032	Double Chain Mount
9	BGS053-X-05	Trailing Encoder *(see 6.1.1.)*
10	BG0038-X	Frame Bar *(see 6.5.1.)*
11	CES031	Overhead Adjustable Link
12	PHG014	2 Probe Spare Parts Kit
13	CMG007	Irrigation Kit
14	EA414	3 mm Hex Driver
15	EA470	3/8 in Wrench

Fig. 106 *- Rotix parts*

6.1.1. Encoder Connector Style

Connector Type	Company/Instrument
B	Olympus - OmniScan MX / Zetec - ZIRCON, TOPAZ
C	Olympus - Focus LT / Zetec Z-Scan
D	Olympus - OmniScan MX2, OmniScan SX
F	TD - Focus Scan, Handy Scan, Pocket Scan

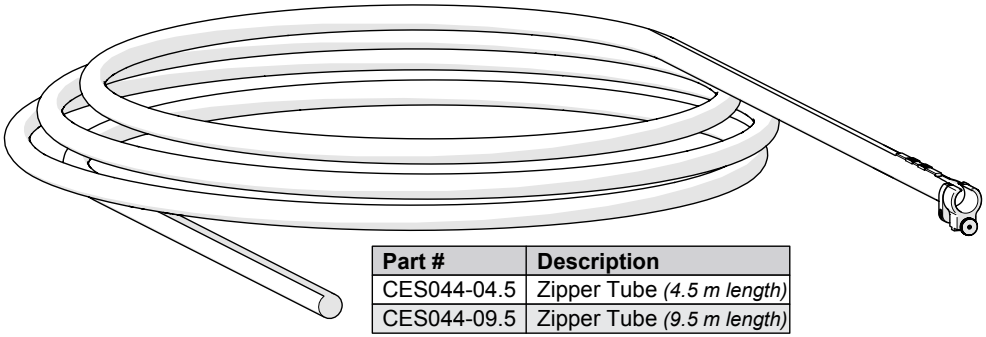
Connector Type	Company/Instrument
G	Sonotron - Isonic
M	GE - USM Vision
U	Sonatest - VEO, PRISMA

Fig. 107 - Umbilical style

***NOTE:** Additional encoder connector styles available. (contact Jireh Industries Ltd. on page i)*

6.2. Accessories

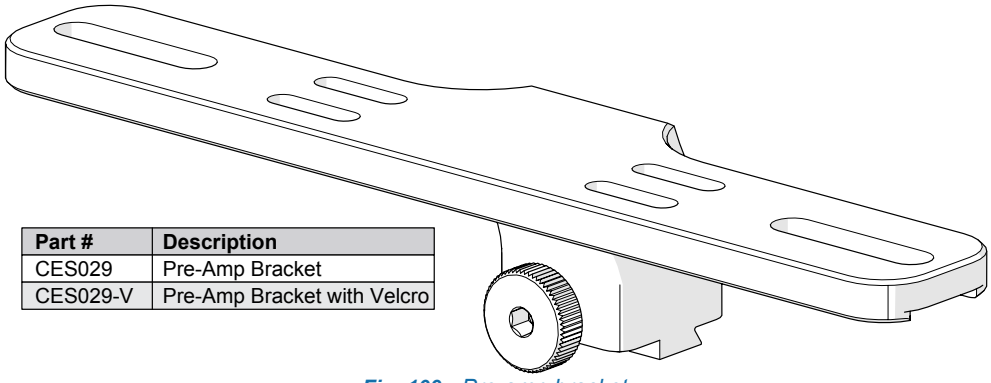
6.2.1. Zipper Tube



Part #	Description
CES044-04.5	Zipper Tube *(4.5 m length)*
CES044-09.5	Zipper Tube *(9.5 m length)*

Fig. 108 - Zipper Tubes

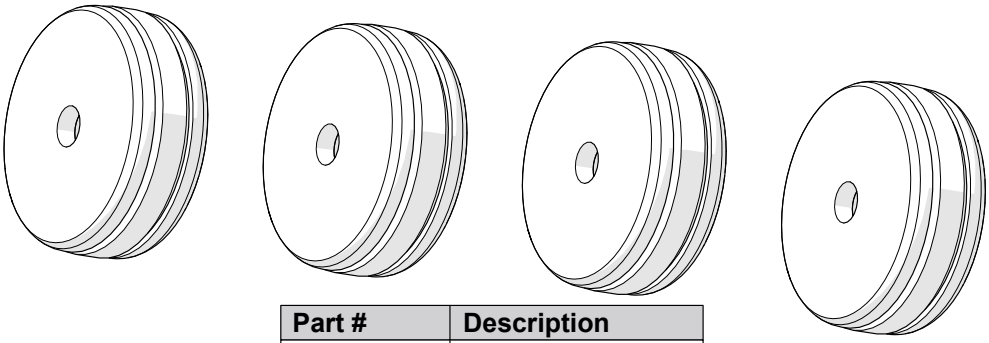
6.2.2. Pre-Amp Bracket



Part #	Description
CES029	Pre-Amp Bracket
CES029-V	Pre-Amp Bracket with Velcro

Fig. 109 - Pre-amp bracket

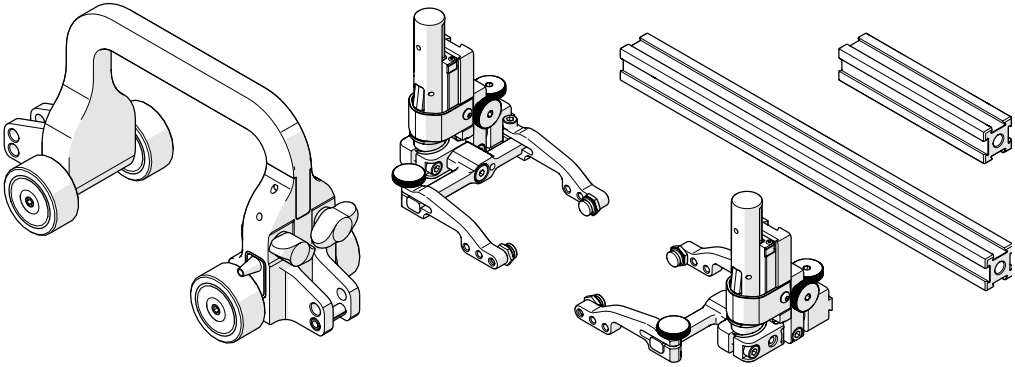
6.2.3. Magnetic Wheel Kit



Part #	Description
BTG014	Magnetic Wheel Kit

Fig. 110 - Magnetic wheel kit

6.2.4. Reduced Width Scanning Kit

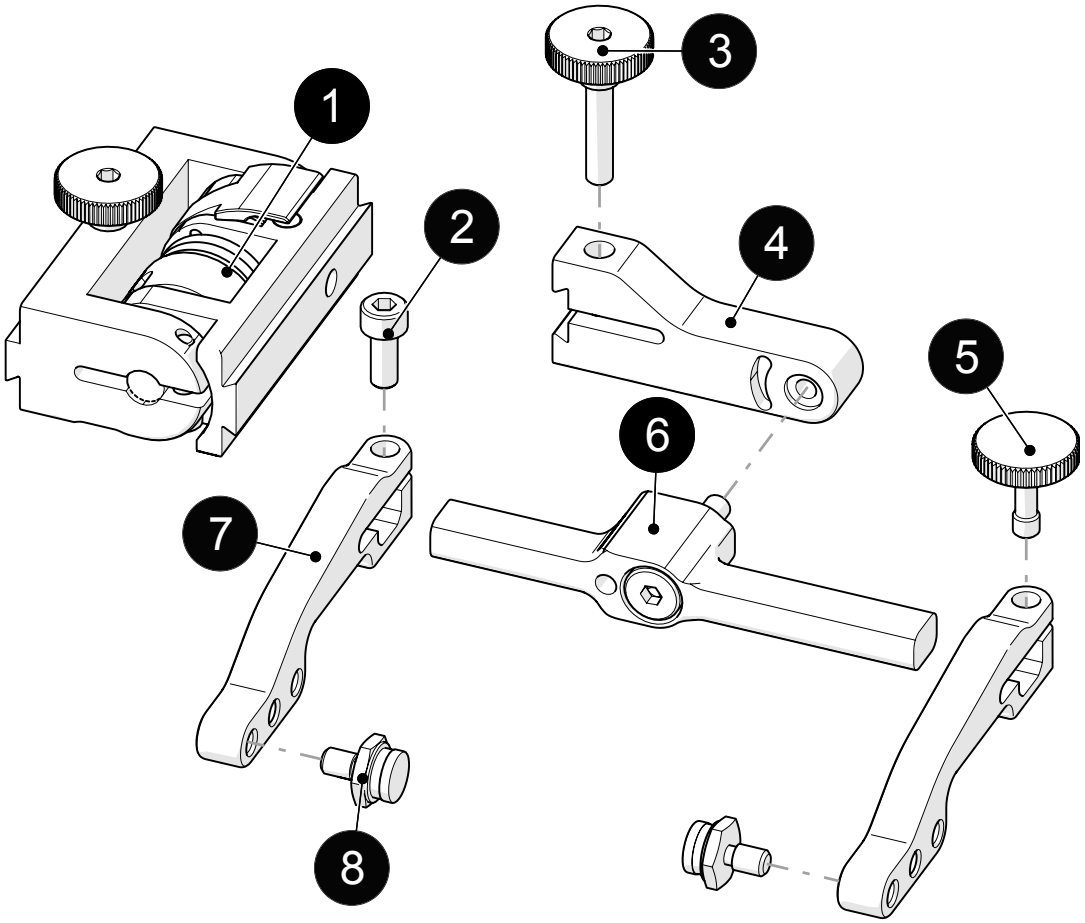


Part #	Description
CEG018-W-XX-Y-Z	Reduced Width Scanning Kit, *W - See 6.1.1, XX - See 6.4.3, Y - See 6.4.1, Z - See 6.4.2*

Fig. 111 - Reduced width scanning kit

6.3. Probe Holders

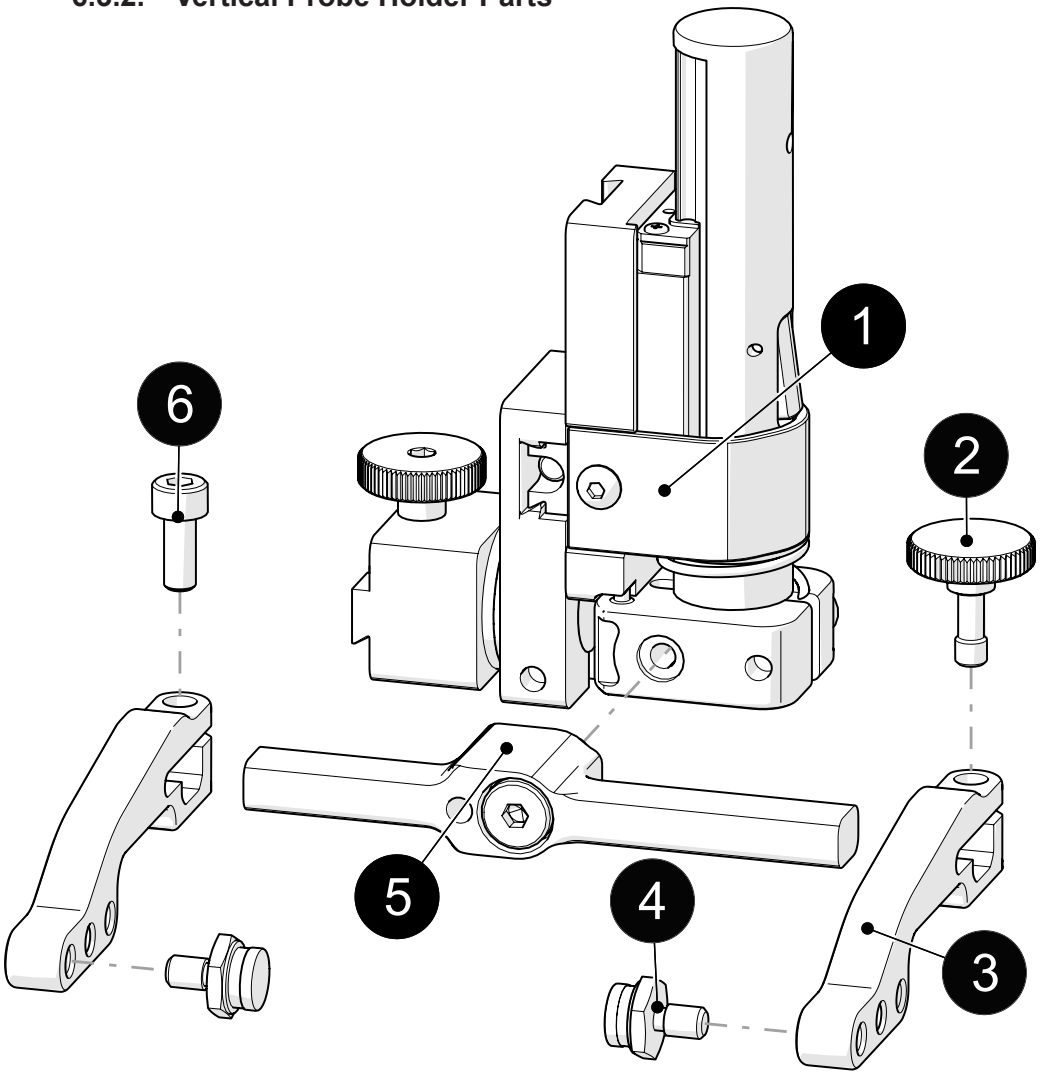
6.3.1. Slip Joint Probe Holder Parts



BOM ID	Part #	Description
1	PHS022	Slip Joint Probe Holder Subassembly
2	MD050-010	Arm Clamp Screw, SHCS, M4x0.7 X 10 mm, SST
3	PH0104	Swing Arm Knob
4	PH0100	Swing Arm
5	PH0082	Probe Holder Arm Adjustment Knob
6	SEE 6.4.2	Yoke Style
7	SEE 6.4.1	Arm Style
8	PH0011-X	Pivot Button Style (*see 6.4.3)*

***Fig. 112** - Slip joint probe holder parts*

6.3.2. Vertical Probe Holder Parts

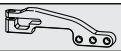


BOM ID	Part #	Description
1	PHS028	Vertical Probe Holder Subassembly
2	PH0082	Probe Holder Arm Adjustment Knob
3	SEE 6.4.1	Arm Style
4	PH0011-X	Pivot Button Style (*see 6.4.3)*
5	SEE 6.4.2	Yoke Style
6	MD050-010	Arm Clamp Screw, SHCS, M4x0.7 X 10 mm, SST

***Fig. 113** - Vertical probe holder*

6.4. Probe Holder Components

6.4.1. Arm Style

	Arm Style	Part #	
A	Standard	PH0090	
B	Short	PH0089	
C	Long	PH0099	
D	Standard, Drop	PH0093	
E	Short, Drop	PH0092	

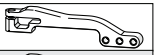
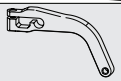
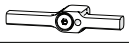
	Arm Style	Part #	
F	Long, Drop	PH0094	
G	Standard, Extra-Drop	PH0096	
H	Short, Extra-Drop	PH0095	

Fig. 114 - Probe holder arm selection

6.4.2. Yoke Style

	Yoke Style	Part #	Length	
S	Standard	PHS017	6.27 cm (2.470 in)	

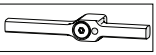
	Yoke Style	Part #	Length	
W	Wide	PHS027	7.78 cm (3.064 in)	

Fig. 115 - Probe holder yoke selection

6.4.3. Pivot Button Style

	Pivot Hole Size	Wedge Type	
01	8.0 mm (0.315 in)	Olympus PA	
02	5.0 mm (0.197 in)	Olympus TOFD	
03	2.7 mm (0.106 in)	Sonatest DAAH PA	
04	9.5 mm (0.375 in)	-	

	Pivot Hole Size	Wedge Type	
06	3.0 mm (0.118 in)	-	
07	2.3 mm (0.090 in)	-	
08	Conical Head	-	
09	5 mm (0.197 in) Internal	Zetec PA/TOFD	

Fig. 116 - Probe holder button selection

***NOTE:** Additional probe holder pivot button types available. (contact Jireh Industries Ltd. on page i)*

6.5. Variable Components

6.5.1. Frame Bars

Part #	Length	
BG0038-05	5 cm *(1.969 in)*	
BG0038-10	10 cm *(3.937 in)*	
BG0038-15	15 cm *(5.906 in)*	
BG0038-20	20 cm *(7.874 in)*	
BG0038-25	25 cm *(9.843 in)*	
BG0038-30	30 cm *(11.811 in)*	

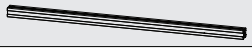
Part #	Length	
BG0038-35	35 cm *(13.780 in)*	
BG0038-40	40 cm *(15.748 in)*	
BG0038-45	45 cm *(17.717 in)*	
BG0038-50	50 cm *(19.685 in)*	
BG0038-55	55 cm *(21.654 in)*	

Fig. 117 - Frame bar selection

7. Limited Warranty

WARRANTY COVERAGE

Jireh Industries warranty obligations are limited to the terms set forth below: Jireh Industries Ltd. (“Jireh”) warrants this hardware product against defects in materials and workmanship for a period of THREE (3) YEARS from the original date of purchase. If a defect exists, at its option Jireh will (1) repair the product at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. A replacement product/part assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Jireh’s property. When a refund is given, your product becomes Jireh’s property.

OBTAINING WARRANTY SERVICE

To utilize Jireh’s warranty service you must ship the product, at your expense, to and from Jireh Industries. Before you deliver your product for warranty service you must phone Jireh and obtain an RMA number. This number will be used to process and track your product. Jireh is not responsible for any damage incurred during transit.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for Jireh Industries. This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication, or non-Jireh products; (b) to damage caused by service (including upgrades and expansions) performed by anyone who is not an Jireh Authorized Service Provider; (c) to a product or a part that has been modified without the written permission of Jireh.

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